Community Fire Safety Program for Cerrito Agricultural School

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An Interactive Qualifying Project submitted to the Faculty of
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Bachelor of Science

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Submitted to:

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Abstract

Fires in Paraguay have been on a steady increase in recent years impacting the lives and well-being of those affected by them. A team of students from Worcester Polytechnic Institute worked with the Cerrito Agricultural School to improve fire safety awareness. The team used interviews, surveys, and workshops to create a fire safety community outreach program for four schools in Benjamín Aceval and two neighboring communities. These workshops were led by members of the fire safety committee created by the team and consisted of a fire safety and prevention presentation and a fire safety activity. Throughout their 7 weeks of research, the team also created three fire risk assessment clocks, a website to indicate the daily fire risk, and used their committee to spread awareness of the risks and consequences of fire.

Acknowledgments

Our team would like to acknowledge and recognize all those who have assisted us with the creation of our project. Specifically, we would like to thank our professors Dorothy Burt and Lina Muñoz-Marquez for their constant time, attentiveness, and dedication to our team. Moreover, we would like to acknowledge the director of the Cerrito school Prof. Amalio Enciso and our counterpart Prof. Ruth Guerra for their willingness to collaborate with us and discuss possibilities for our project. Additionally, we would like to thank Walter Sánchez for his involvement with our team and his essential experience with the Qom community.

We are aware of how unsettling it may be to have strangers come into your schools and communities and consult with you on how to solve certain issues. With this, we would like to thank the students and professors at the four schools we have visited and members of the United Neighbors community for accepting us into their spaces and participating in our workshops. As a team, we would also like to acknowledge our sponsors Fundación Paraguaya with founder Martin Burt and his assistance with our website, the Cerrito Agricultural School, and our college Worcester Polytechnic Institute. Without these sponsors, we would not have been able to partake in such a great experience.

We are extremely grateful for all the support we have received during our project, but this report would not be complete without giving a huge thank you to the members of our fire safety committee at the school. Thank you to Micaela Arevalos, Julia Bernal, Giannina Burgos, Rodney Céspedes, Ayelem Fernández, Jaime Machuca, Mauricio Ovelar, Emmanuel Pérez, Ricardo Portillo, Armin Sanabria, Brahian Sánchez, and Jonathan Vianconi. The team will forever be so proud of what the committee achieved and recognizes their tremendous part in the success of our project.

Executive Summary

Purpose and Goals:

In response to the increase of wildfires in Paraguay our team was tasked with developing a community outreach program for four schools and two communities in Benjamín Aceval. The goal of this community outreach program was to spread awareness of the importance of fire safety, highlighting the causes and consequences of fires. To reach this goal the objectives of the project were to:

1. Assess social and ecological factors increasing and mitigating the risk of fires.
    a. Evaluate social perceptions and practices incentivizing the use of fire.
    b. Identify ecological factors that increase the risk of fires in the community.
2. Understand the current fire preparedness and prevention methods employed by the Cerrito Agricultural School and surrounding communities.
3. Create a comprehensive fire safety program.
    a. Contact community outreach experts.
    b. Earlier detection and prevention of fires.
    c. Increasing fire safety awareness.

Methodology

Throughout the seven weeks of our project, we used semi-structured interviews, semi-structured surveys, and our community outreach method to achieve our project objectives. Semi-structured interviews were used frequently throughout our project to interview key informants such as our group counterparts, social workers, and firefighters to gain insights into current prevention methods and the factors increasing and mitigating the risk of fires. Our second methodology was a semi-structured survey which recruited students for our fire safety committee based on their availability and interest in fire safety. Lastly, we used our community outreach method which included the fire safety committee, fire risk assessment clocks, and fire prevention workshops to spread the importance of fire safety to our target groups. These tools were used to educate and inform the community about the dangers of fires with the goal of preventing fires.

Results

Our two main deliverables were our fire risk assessment clocks and our community outreach program which consisted of a fire safety committee in the Cerrito school and fire prevention workshops with different communities who live near the school. The fire risk clocks had a color scale indicating the fire risk level, calculated by a formula considering humidity, wind speeds, rainfall, and temperature. Each sign had a QR code linking to a website we created that displays the daily fire risk level and its description. The fire risk assessment clocks were strategically placed in three areas nearby and within the school's campus to ensure maximum visibility and accessibility. The color scale on the clocks allowed people to quickly and easily determine the level of risk for that day, and the QR codes provided a convenient way for people to access the website and learn more about the risks and prevention measures.

The Cerrito School Committee of 12 students received training on fire prevention and safety from presentations we created for them, as well as a meeting with volunteer firefighters. The committee led seven workshops for four different schools and two surrounding communities to educate on the importance of fire prevention and safety. The committee not only improved community awareness on the risks and consequences of fires but created more discussion on fire prevention and safety within the Cerrito school. To solidify the committee, the committee members voted on roles such as president, secretary, and educator. We ended our time with the committee by celebrating their work with fire safety certificates and a year long plan for them to continue with the work we started together.

Recommendations

As a team, we highly recommend that the Cerrito School continues to prioritize fire safety awareness and prevention as there are communities and groups we could not meet with during our time. One of our main recommendations is that the school's fire safety committee continue their work, conducting fire prevention workshops and following the year-long curriculum we have created for them. We also recommend that the school implements a fire safety curriculum, either as mandatory training or a course taught at the school. The school could also create a fire safety week with daily activities to remind people about the risks and consequences of fires. Additionally, the school with the help of Fundación Paraguaya, should

continue to install fire risk assessment clocks in more areas of the surrounding community. A relationship with community members such as conducting trash cleanups and partnering with them for ideas and feedback is something we greatly recommend to continue improving fire safety.

Conclusion

The goal and objectives of our project were successfully achieved using instructional and informational outreach methods. Our team utilized the respective methods by creating a fire safety committee at the Cerrito school, three fire risk clocks, and fire safety workshops. These outreach methods allowed us to inform members of the school as well as the surrounding communities of the importance of fire safety and prevention. Altogether our team recognizes that the issue of wildfires in Paraguay will take time and effort to alleviate. Nevertheless, we believe that spreading awareness of the danger fires pose is an essential first step. The deliverables of our project ensure that the Cerrito Agricultural School has many ways to improve fire safety awareness in their surrounding community. These deliverables work to form the foundation for continued progress on fire safety in Benjamín Aceval by strengthening the relationship between the school and its surrounding communities.

Resumen ejecutivo

Propósito y Metas:

En respuesta al aumento de incendios forestales en Paraguay, nuestro equipo se encargó de desarrollar un programa de alcance comunitario para cuatro escuelas y dos comunidades en Benjamín Aceval. El objetivo de este programa comunitario fue difundir la conciencia sobre la importancia de la seguridad contra incendios, destacando las causas y consecuencias de los incendios. Para alcanzar esta meta, los objetivos del proyecto fueron:

1. Evaluar los factores sociales y ecológicos que aumentan y mitigan el riesgo de incendios
    a. Evaluar las percepciones y prácticas sociales que incentivan el uso del fuego
    b. Identificar los factores ecológicos que aumentan el riesgo de incendios en la comunidad
2. Comprender los métodos actuales de preparación y prevención de incendios empleados por la Escuela Agrícola de Cerrito y las comunidades aledañas.
3. Crear un programa integral de seguridad contra incendios.
    a. Communicarse con expertos en alcance comunitario
    b. Detectar y prevenir incendios de forma temprana
    c. Aumentar la conciencia de seguridad contra incendios

Metodología

A lo largo de las siete semanas de nuestro proyecto, utilizamos entrevistas semiestructuradas, encuestas semiestructuradas y nuestro método de alcance comunitario para lograr los objetivos de nuestro proyecto. Las entrevistas semiestructuradas se utilizaron para entrevistar a informantes clave como nuestros colaboradores locales, trabajadores sociales y bomberos para obtener información sobre los métodos de prevención actuales y los factores que aumentan y mitigan el riesgo de incendios. Nuestra segunda metodología fue una encuesta semiestructurada que reclutó estudiantes para nuestro comité de seguridad contra incendios en función de su disponibilidad e interés en la seguridad contra incendios. Por último, utilizamos nuestro método de extensión comunitaria que incluía el comité de seguridad contra incendios, letreros de evaluación de riesgos de incendios y talleres para difundir la importancia de la seguridad y prevención contra incendios a nuestros grupos objetivo.

Resultados

Nuestros dos productos finales principales fueron nuestros relojes de evaluación de riesgo de incendio y nuestro programa de alcance comunitario que consistió en un comité de seguridad contra incendios en la escuela Cerrito y talleres de prevención de incendios con diferentes comunidades que viven cerca de la escuela. Los relojes de riesgo de incendio tenían una escala de colores que indicaba el nivel de riesgo de incendio, calculado mediante una fórmula que consideraba la humedad, la velocidad del viento, la lluvia y la temperatura. Cada cartel tenía un código QR que se vinculaba a un sitio web que creamos que muestra el nivel de riesgo de incendio diario y su descripción. Los relojes de evaluación de riesgo de incendio se colocaron estratégicamente en tres áreas cercanas y dentro del campus de la escuela para garantizar la máxima visibilidad y accesibilidad. La escala de colores de los relojes permitió a las personas determinar rápida y fácilmente el nivel de riesgo para ese día, y los códigos QR proporcionaron una forma conveniente para que las personas accedieran al sitio web y obtuvieran más información sobre los riesgos y las medidas de prevención.

El Comité de la Escuela Cerrito de 12 estudiantes recibió capacitación sobre prevención de incendios y seguridad a partir de presentaciones que creamos para ellos, así como una reunión con bomberos voluntarios. El comité dirigió siete talleres para cuatro escuelas diferentes y dos comunidades aledañas para educar sobre la importancia de la prevención y seguridad contra incendios. El comité no solo mejoró la conciencia de la comunidad sobre los riesgos y las consecuencias de los incendios, sino que generó más debate sobre la prevención y seguridad de incendios dentro de la escuela Cerrito. Para solidificar el comité, los miembros del comité votaron sobre roles como presidente, secretario y educador. Terminamos nuestro tiempo con el comité celebrando su trabajo con certificados de seguridad contra incendios y un plan de un año para que continúen con el trabajo que comenzamos juntos.

Recomendaciones

Como equipo, recomendamos enfáticamente que la Escuela Cerrito continúe priorizando la concientización y la prevención de la seguridad contra incendios, ya que hay comunidades y grupos con los que no pudimos reunirnos. Una de nuestras principales recomendaciones es que el comité de seguridad contra incendios de la escuela continúe con su trabajo, realizando talleres de

prevención de incendios y siguiendo el plan de estudios de un año que hemos creado para ellos. También recomendamos que la escuela implemente un plan de estudios de seguridad contra incendios, ya sea como capacitación obligatoria o como un curso impartido en la escuela. La escuela también podría crear una semana de seguridad contra incendios con actividades diarias para recordar a las personas sobre los riesgos y las consecuencias de los incendios. Además, la escuela, con la ayuda de la Fundación Paraguaya, debe continuar instalando relojes de evaluación de riesgo de incendio en más áreas de la comunidad circundante. Una relación con los miembros de la comunidad, como realizar limpiezas de basura y asociarse con ellos para obtener ideas y comentarios, es algo que recomendamos encarecidamente para continuar mejorando la seguridad contra incendios.

Conclusión

La meta y los objetivos de nuestro proyecto se lograron con éxito utilizando métodos de difusión instructivos e informativos. Nuestro equipo utilizó los métodos respectivos al crear un comité de seguridad contra incendios en la escuela Cerrito, tres relojes de riesgo de incendios y talleres de seguridad contra incendios. Estos métodos de divulgación nos permitieron informar a los miembros de la escuela, así como a las comunidades aledañas, sobre la importancia de la seguridad y la prevención de incendios. En conjunto, nuestro equipo reconoce que el problema de los incendios forestales en Paraguay requerirá tiempo y esfuerzo para solucionarse. Sin embargo, creemos que difundir la conciencia sobre el peligro que representan los incendios es un primer paso esencial. Los resultados de nuestro proyecto aseguran que la Escuela Agrícola de Cerrito tenga muchas formas de mejorar la conciencia sobre la seguridad contra incendios en la comunidad que la rodea. Estos productos finales funcionan para formar la base para el progreso continuo en seguridad contra incendios en Benjamín Aceval al fortalecer la relación entre la escuela y las comunidades circundantes.

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1.0 Introduction

Wildfires pose a significant threat to not only Escuela Agrícola San Francisco (hereafter referred to as Escuela Cerrito, Cerrito School or Cerrito Agricultural School) but also the community of Benjamín Aceval in Paraguay. This is because climate change has made Paraguay more susceptible to wildfires. Unless the community receives proper education and knowledge of the dangers of fire, the school's campus, staff, students, and eucalyptus groves are at risk. In response, our team was asked to develop a community outreach program to improve fire safety awareness and prevention. The outreach program would aim to educate the Cerrito School students and the Benjamín Aceval community to be more mindful of the increasing threat of wildfires and their devastating impacts.

To achieve this our team met with and interviewed experts and primary counterparts to gather more information about the risks, origins, and impacts of fire for the school and the surrounding communities. Our team used this information to guide our project and to create informational materials to distribute to the local schools and communities. We worked with our counterparts Prof. Amalio Enciso, director of the Cerrito School, and Prof. Ruth Guerra, to revise our fire safety materials and approach before implementing them in the community.

Last year's IQP group, which worked on fire safety preparedness, made significant progress. By consulting with experts and creating detailed maps of the campus, they identified key locations for fire prevention resources and vulnerable points for potential fire hazards. They also established clear roles and responsibilities in case of a fire emergency, assigning roles to staff members in the event of an evacuation, adding a drone to the forest fire detection plan, and using clocks in the eucalyptus groves to discourage garbage burning. Overall, this group was able to significantly improve the fire safety preparedness of the school and ensure that everyone on campus is prepared in case of an emergency.

This project builds on last year's IQP work to expand fire safety and awareness to external stakeholders. These include the neighboring Latino Paraguayan community, indigenous Qom community, and four local schools. For this purpose, our team decided to create a fire safety committee with students from Cerrito Agricultural School as well as fire risk assessment

clocks. The main goal of the committee was to improve fire safety by spreading knowledge on the dangers of fires as well as prevention methods. Our team trained the committee to inform the local communities and schools about fire safety and prevention. Furthermore, the team created fire risk clocks as a visual way to promote awareness of the daily fire risk. Altogether building the fire safety committee and fire risk assessment clocks at the Cerrito Agricultural School are important steps toward improving overall fire safety and awareness for the communities in Benjamín Aceval.

2.0 Background

The goal of our project was to implement fire safety clocks and a community outreach program for the Cerrito Agricultural School and surrounding communities. This chapter aims to provide a comprehensive understanding of our project by explaining several topics key to the issue of wildfires in Paraguay. In doing so this chapter covers Paraguay's history and relationship with wildfires and man-made fires, the relationship between poverty and fire management, as well as important locations such as the Paraguayan Chaco and the Cerrito Agricultural School. This chapter also includes a discussion on project stakeholders and fire prevention strategies currently employed by the Cerrito school.

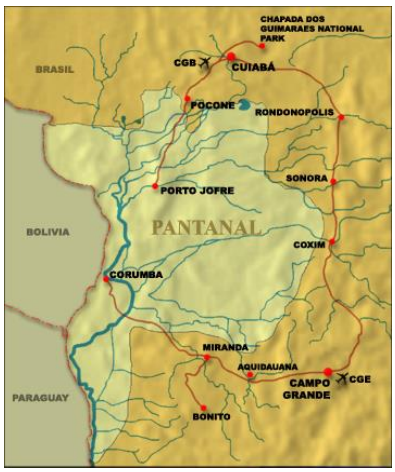
2.1 A Brief History of the Wildfires in Paraguay

Wildfires have been a major problem in Paraguay in recent years. In 2019, Paraguay's government declared an environmental emergency due to forest fires in the areas of Alto Paraguay and Boquerón Paraguay. At this point, more than 37,000 hectares of forest had caught on fire. The same year, there had also been more than 7,000 smaller fires due to household burning of trash and grasslands, which is used as a method of clearing the fields (LLC, 2019). The Pantanal is a tropical wetland located within the Paraguayan Chaco and is shared between Paraguay, Brazil, and Bolivia. In 2020, the Pantanal experienced a 376% increase in the amount of land burned in comparison to averages from 2003 to 2019. Of the land burned in 2020, 43% had not been affected by fires during that same time frame (Garcia et al., 2021).

There are a wide range of causes for this increase in wildfires, one of the largest being the environmental factors affecting wildfires and their occurrence, particularly droughts. In 2020 there was 60 percent less rain in the Pantanal wetlands, and the country experienced the lowest water level in the flooding period of the Paraguay River in 17 years. This drought caused high temperatures and low humidity, leaving the soil dry and the vegetation much more prone to catching on fire, allowing the fire to spread. These dry vegetation fires are significantly more dangerous because the fires are taller and release more intense flames with higher temperatures (Garcia et al., 2021).

Figure 1

The Pantanal Region



Note. From Brazil Travel Guide—The Pantanal. (n.d.). Retrieved March 1, 2023, from https://www.braziltravelinformation.com/brazil_pantanal.htm

These wildfires, along with trash burning, are harmful in a multitude of ways. Their harm can be seen with the increase in water pollution and air pollution. With increasing amounts of waste due to inefficient use of resources, trash burning is a mechanism households use to dispose of their waste instead of disposing it in landfills (Sivertsen, 2006). As of August 2021, more than 600,000 households in Paraguay burn their trash which is about 31.3% of the country's population. The issue of trash burning is much more prevalent in rural areas, where about 64.8% of households burn their trash, compared to urban homes, where about 12% burn their trash (600 Mil Hogares, 2021). There are no widely used public waste collection methods in the country, making trash burning the most convenient way for Paraguayans to dispose of their trash. Due to this, many people choose to use trash burning instead of a trash service since it costs 50.000 guaraníes per month and is limited to only 2 trash bags per household per week, which we learned during our workshop with the neighboring community.

In 2019, only 52.6% of households had their waste picked up and disposed of by means of private and municipal waste disposal methods. Due to the improper disposal of waste in the

country, water pollution has increased, and there has been an elevated risk of water-related mortality due to unsafe drinking water (Pollution / Paraguay, n.d.). Air pollution due to trash burning is also a significant concern as it can cause illnesses and premature death in people exposed to the polluted air. One of the major air pollutants is a primary organic aerosol (POA), and trash burning emits 25 tons of POA per day. With the reduction of trash burning, the levels of these pollutants could be reduced by up to 40% (Hodzic et al., 2012). In addition to trash burning, many young people in the Qom community use fire as a pastime. They will set fires for fun and their carelessness will lead to forest fires in the local eucalyptus groves (A. Enciso, Interview, March 28, 2023).

2.2 Paraguay's Approach to Fire Prevention

Fire preparedness in Paraguay has been a significant concern due to the high incidence of wildfires in the region. In 2007, over 5,000 brush fires broke out in Paraguay, displacing tens of thousands of families, killing several thousand heads of cattle, and destroying significant expanses of grazing land, crops, forests, and protected areas. At the time, Paraguay relied on a nationwide network of volunteer firefighters that was unable to combat an emergency of such magnitude. Paraguay's network of volunteers runs thin with only a few hundred volunteering for the red cross and many of those members are wearing multiple hats, overworking themselves (Urby & McEntire, 2006).

USAID has been providing training and technical assistance in Paraguay since 2001 to help develop the country's disaster management policies. Training like Advanced First Aid, Evaluation of Injuries, and Analysis of Needs, Forest Firefighters, and Administrators of Disasters have been provided by organizations from the United States in Paraguay for years now (Urby & McEntire, 2006). When the 2007 fires broke out, USAID expanded its assistance to support the government's response coordination efforts, guiding on how best to combat the destructive fires. Through USAID's efforts, Paraguay transformed the legal and policy framework for wildfire management. It identified and addressed weaknesses in the existing system by facilitating coordination among government ministries, the private sector, and academia. USAID also supported the professionalization of volunteer firefighter brigades

through enhanced management training and instruction on wildfire prevention and control. Additionally, "USAID provided essential communications and protective gear, as well as necessary tools such as water pumps, fire hoses, shovels, rakes, chainsaws, and axes" to assist the country in its fire management (Pounds of Prevention, n.d.). Extensive training and education from organizations similar to USAID have significantly helped Paraguay in identifying key weaknesses within its existing fire management systems.

The Instituto Forestal National (INFONA) is also an important government organization in Paraguay whose goal is sustainable forest management. One of INFONA's main objectives is preventing forest fires caused by the negligent use of fire. To achieve this objective INFONA promotes laws, holds events, and publishes articles to inform the public of issues facing Paraguay's forests. INFONA cites that since 2010, Law No. 4014 on "Fire Prevention and Control" has been in force, which allows controlled burning for agricultural production (INFONA, n.d.). In addition, INFONA also provides fire safety recommendations because inadequate fire management techniques can lead to loss of biodiversity, property, and human lives. Through their work, INFONA has made invaluable progress towards improving fire safety by spreading awareness as to the dangers poorly maintained fires pose.

2.3 Poverty and Fire Management

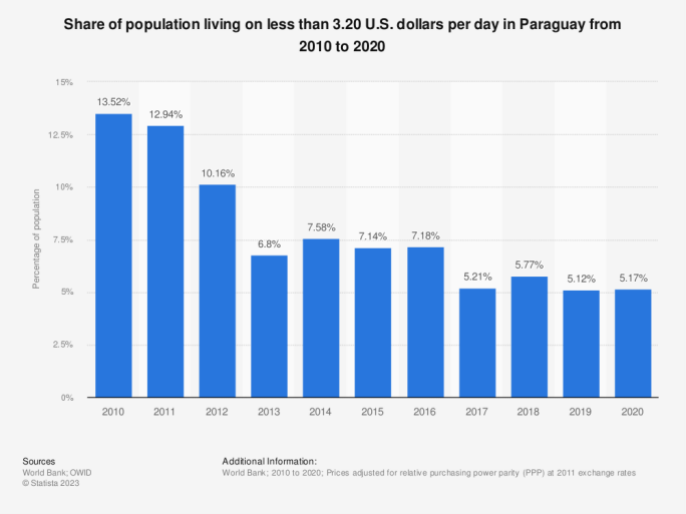
Paraguay's socioeconomic status must be discussed to understand the prevalence of human-caused fires and how this country has dealt with fire management. Paraguay has a long extensive history of poverty in their country. This issue of impoverishment has stemmed from a lack of public sector investment and constant changes in leadership. In the mid-1980s, there had been economic growth for Paraguayans who lived near or within the city, but those who lived in the rural areas of Paraguay, remained poor (Painter, 2020). Nearly 30 years later, in 2010, The World Bank stated that, "almost 2 out of five Paraguayans are poor and one out of five are in extreme poverty" (World Bank, 2010). After 2010, the country made great strides in decreasing overall poverty, cutting its poverty rates in half, increasing its labor force, and implementing poverty elimination programs (World Bank, 2020). This, unfortunately, came to a standstill after

the Covid-19 pandemic in 2020, leaving Paraguayans, especially those living within rural areas, with a worsened socioeconomic status.

This relationship between poverty and fire management takes place primarily within the rural areas of Paraguay, where nearly 40% of the population lives, earning money from their agricultural jobs (Godfrey et al., 2011). As discussed in section 1.1, trash burning is more prevalent in the country's rural areas. These rural areas also participate in crop burning more frequently than Paraguayans who live near or within the city as it is a free method to clear their crops. Both trash and crop burning are essential to how Paraguayans in the countryside live. This makes it difficult for proper fire management to be instilled in these areas as it may not be manageable or affordable, without disrupting their way of life. However, this disparity in who participates in deliberate fire burning creates a discrepancy between those at risk of fires.

Figure 2

Paraguayan Population Living on less than $3.20 per day (2010-2020)



Note. From Poverty rates in Paraguay. (2023, February 2). Statista. https://www.statista.com/statistics/788962/poverty-rate-paraguay/

A research team supported this claim by evaluating "Black Summer" fires in Australia from 2019 to 2020. They determined a significant positive correlation between fire hazard exposure and socioeconomic disadvantage. The team described that the most socioeconomically disadvantaged communities bore a disproportionately higher hazard exposure (Akter & Grafton,

2021). Although these fires took place in Australia, this same conclusion can be applied to the relationship between fire risk and poverty in Paraguay. We are seeing that Paraguayans who are socioeconomically disadvantaged are at more risk of starting fires, which in turn increases their risk of being harmed in a fire.

2.4 Stakeholders

The major stakeholders for this project are the members of the Cerrito Agricultural School, the neighboring Cerrito community and schools, and Fundación Paraguaya. Founded in 1985 by Martin Burt, Fundación Paraguaya was Paraguay's first microfinance institution and is an international non-governmental organization whose goal is to tackle the country's impoverishment. They have been praised for incorporating the "teach a man to fish" philosophy, and have been described as poverty revolutionizers, by leaving room for the impoverished to voice and speak for themselves (Burns et al., 2016). Fundación Paraguaya has created several campaigns and programs to eliminate poverty, some of their most recognized being their poverty stoplight program, entrepreneurial schools, and self-sufficient agricultural schools (Lablanc et al., 2021).

Fundación Paraguaya's Cerrito Agricultural School uses agricultural and entrepreneurial skills to achieve self-sustainability. Located in the rural town of Benjamín Aceval, the Cerrito Agricultural School alternates between classroom learning and hands-on trade skills. These trade skills include farm work, livestock management, general services, hospitality, and bread and cheese making. Fundación Paraguaya began managing the school in 2002 and implemented its financially self-sustainable school model. The model has been very successful, allowing the school to subsidize student tuition, room, and board. The Cerrito School has significantly impacted the lives of the students and has shown great success in self-sustainability. Miranda Grizio, a food scientist and advocate for sustainable food systems, states, "The school has been able to cover the full cost of its operations, earning more than US $300,000 annually" (Grizio, 2018). All students who graduate from the school leave with enough experience and knowledge to be self-providing, and with diplomas as technicians in agriculture, hospitality, and tourism.

Paraguay has many indigenous populations, some being the Guaraní, Ayoreo, Toba-Maskoy, Ache, and Sanapan (Paraguay – World Directory, 2015). The Guaraní language is the official language of the country, alongside Spanish. Surrounding the Cerrito school is the indigenous Qom community which primarily speaks Qom and Guarani. From our research at the Cerrito school, our team learned that the Qom community uses open fires regularly for cooking and trash disposal (W.Sánchez, interview, March 21, 2023). These open fires pose a great risk because if not properly monitored, strong winds can propagate them onto the school's campus and the community. In 2022, there were three incidents where fires lit by community members for trash burning or entertainment led to out-of-control fires (A.Enciso, interview, March 28, 2023). One of these fires resulted in 50 eucalyptus trees being burnt. It is estimated that a fire in a eucalyptus forest causes a loss of around 42,000,000 guaraníes per hectare (R.Gauto, interview, March 27, 2023). This incident highlights the impact such fires can have on the Cerrito school's self-sustainability as damage to the eucalyptus groves causes substantial revenue loss.

Last year's IQP on fire prevention reported that due to a disinterest in waste management strategies, these communities use trash burning as a regular trash disposal method. In the past, members of Fundación Paraguaya have attempted to implement alternative methods to trash burning for the Qom community but have not been successful. This is largely due to the fact that the Qom community has been described as a community that has its own laws and internal rules (W.Sánchez, interview, March 21, 2023). The director of the Cerrito school, Prof. Amalio Enciso, has a relationship with the Qom community and has tried to provide them with some basic training in case of a fire (A.Enciso, interview, March 28, 2023). Unfortunately, there has not been an improvement in fire safety and awareness in the community. Currently, Fundación Paraguaya social workers, Walter Sánchez and Cecilia Monges, are working with the Qom community to implement their poverty stoplight program. These connections provide opportunities to work with the Qom community to improve fire safety awareness.

Two additional stakeholders for our project are the Latin Paraguayan community and students from schools in Benjamín Aceval. The Latin Paraguayan communities and schools surround the Cerrito school and primarily speak Spanish. As a team we worked with a community from the San José Obrero neighborhood, and with four schools in Benjamín Aceval: Colegio Domingo Masi, Colegio San Francisco de Asís, Colegio Nacional Cerrito, and Escuela

Básica N°4098 Rosarino. These schools contain grades kindergarten through twelfth grade and were all in close proximity to the Cerrito School (A.Gonzales, interview, April 4, 2023). These target groups were of importance to us as they represented the three groups most likely to be harmed in a fire: the elderly, children, and people in low-income communities.

With Paraguay's increasing risk of fires, ensuring the safety of both the students at the Cerrito Agricultural School and the members of the surrounding community in Benjamín Aceval was our top priority. For this reason, determining effective ways to increase fire safety and awareness for all four affected groups highlights the importance of our outreach program. If this is not implemented at the Cerrito school, students, and community members are at a continued risk of being harmed in a fire.

2.5 The Cerrito Agricultural School

2.5.1 The Chaco Region and Risks of Fires on Campus

The Paraguayan Chaco, also known as the Región Occidental (Western Region), is a subtropical region in Paraguay. The Cerrito Agricultural School is located within the city of Benjamín Aceval in the Paraguayan Chaco. This region is of interest since the issues facing the Chaco are also reflected at the Cerrito Agricultural School. These issues include deforestation, fragmentation, and land transformation for farming. Specifically, deforestation is the removal of a wide area of trees whereas fragmentation is the removal of trees to split a forest into smaller wooded areas. These processes are used to clear land to construct new roads, buildings, and other infrastructure. Land transformations are also occurring so that it is possible to cultivate more land to grow crops (D'Angelo, 2012). Land in the Chaco is also being transformed to develop ranches at the cost of losing wetland areas (Campos-Krauer & Wisely, 2011). The destruction of the Chaco caused by land transformations has ultimately led to a loss of wetlands and biodiversity.

Until last year's IQP on Fire Prevention, the Cerrito Agricultural School has not had an in-depth education on fire preparedness and prevention methods to bolster safety on campus should a fire occur. As suggested by last year's IQP research, during the 'winter season' students have been taught to build and maintain small fires to keep livestock and themselves warm on

campus. It is worth noting that most fires in Paraguay occur during the winter months from July to October (Pezzoli & Ponte, 2016, p. 64).

Figure 3

The Chaco Region

Note. From Map of Paraguay and the Paraguayan Chaco region. (n.d.). ResearchGate. Retrieved March 1, 2023, from https://www.researchgate.net/figure/Map-of-Paraguay-and-the-Paraguayan-Chaco-region_fig1_359608852

Amongst the increase in wildfires in Paraguay from prior years, the Cerrito Agricultural School has been able to stay open and offer its technical education. As stated within the project description, a risk is that the eucalyptus groves on campus are at an adverse risk of catching fire. One of the reasons eucalyptus trees are grown on campus is because of the profit these plants can generate. This is because 60 to 70 percent of their total height, 98 to 180 feet tall, can be achieved in ten years. This means that eucalyptus trees can be readily grown and harvested for the goods they provide, such as timber and the oils from their leaves. However, aside from these monetary benefits, this plant poses numerous fire safety hazards. One such hazard is that its rapid growth rate is accompanied by rapid water uptake, which can lead to wetland draining, making areas more susceptible to catching fire. Also, deciduous eucalyptus trees pose a particular risk as they constantly shed their bark. Additionally, these trees are a fire hazard due to the volatile oils

present in their leaves. In particular, it is dry and dead leave debris from these trees that is flammable and poses a serious fire hazard (Boyd et al., 2006).

Figure 4

The Cerrito School's Eucalyptus Groves

Note. Photograph taken by Walter Sánchez showing the eucalyptus groves on campus.

Another fire risk for the school is the previously mentioned burning of trash on or around campus by neighboring communities. This poses an immediate risk since if the trash is not carefully watched it can cause other fires. In 2022 alone, 50 eucalyptus trees were burned by the consequences of trash burning or intentional fires (A.Enciso, interview, March 28, 2023). The risk of fires on campus threatens the Cerrito Agricultural School's self-sustaining business model since fires may interrupt revenue-producing activities and amenities. This is evident with the loss of revenue in comparison to a tree that is burned versus a tree that is not burned. When speaking with the engineer Raul Gauto, a eucalyptus expert, he stated that the value of a burned eucalyptus tree decreases from $40 per meter cubed to a maximum of $12 per meter cubed (R.Gauto, interview, March 27, 2023). With the destruction of the 50 eucalyptus trees there was a large amount of revenue lost that goes directly towards sustaining the school's amenities.

Figure 5

Burned Eucalyptus Trees in the Qom Community

Note. Photograph taken by Walter Sánchez displaying the burned eucalyptus trees in the Qom community.

2.5.2 Fire Risk Clocks

Throughout the world, there are many countries that have a prevalent fire problem. The United States has a large portion of land that is prone to fires. The United States National Parks Service uses multiple methods to prevent fires in its parks. One of the methods they use across the country is a fire danger sign (Figure 6). The use of these signs has proven effective in showing the fire risk on any given day using "the National Fire Danger Rating System (NFDRS) to input data and to receive information used to determine fire danger in their area" (U.S. Department of the Interior, 2021). This takes into account factors like temperature, humidity, precipitation, and wind speed.

Along with this information, the U.S. Parks Service also uses the Haines index which determines the stability of the atmosphere which, "has been shown to correlate with large fire growth on initiating and existing fires where surface winds do not dominate fire behavior" (U.S. Department of the Interior, 2021). The Platorand Area Fire Protection Association located in South Africa uses similar information for their fire danger rating system. They have created a

tool where someone can enter “each region[‘s] data relating to flammable fuel structure and condition (fuel models) must be specified, together with daily forecast weather data, for inputting to the fire danger model” (PAFPA). They break up fires into 5 different categories, insignificant, low, moderate, high, and extreme. Using information from their website: https://www.pafpa.org/fire-danger-index.php, fire risk can easily be calculated.

Figure 6

Wildland Fire Safety for Park Visitors

Note. From *Wildland Fire Safety for Park Visitors (U.S. National Park Service)*, by U.S. Department of the Interior. (n.d.). Retrieved April 5, 2023, from https://www.nps.gov/articles/wildland-fire-safety-for-park-visitors.htm

2.5.3 The School’s Approach to Fire Preparedness and Prevention

The Cerrito School already has a fire preparedness plan in place. In the case of a fire nearby the school, a staff member will be notified about the fire through instant messaging. The Director uses his pickup truck to tow equipment including “backpacks containing water with a nozzle to spray onto the fire, a hose connected to a small water-filled tank, and a small gas-powered and motorized pump as well as fire beaters to smother the fires” (Miller et al., 2022, p.11). The school has access to an aerial drone with an attached camera. This drone has been a significant improvement because finding fires was “difficult with students and teachers having to search on foot, on horseback or in motor vehicles to find the source of fires” (Miller et al., 2022, p.13). The previous IQP group from 2022 decided to remove all the fire safety equipment on the campus of the Cerrito School. They agreed on this after most fire extinguishers, smoke detectors,

manually operated fire alarms, and sirens were "insufficient, no longer functioning or needed repair" (Miller et al., 2022, p.15). After consulting with the school's director, they decided to install a centrally controlled system to monitor all buildings from one location using smoke and heat detectors. In addition, the school also uses and maintains fire breaks or "cortafuegos" around their fields. These are 6-meter wide dirt paths that are used to prevent the spread of out-of-control fires (A.Enciso, interview, March 28, 2023).

A necessary component of fire prevention is the procedure that is put in place in the event that a fire occurs on campus. This plan has multiple parts, including up-to-date smoke detectors, evacuation routes for each campus building or dorm, and knowledge of where to find and how to use fire emergency fire equipment. When creating an evacuation route, the plan needs to show the safest and most efficient route out of the building. These routes should be clear at all times of storage, trash, and other obstacles. Each building should have its own individual evacuation plan and should be posted on signage in the building. The clocks should include evacuation routes, whom to alert in the event of a fire, and instructions on how to protect oneself in the event of a fire. In addition to this, fire drills should be conducted regularly to prepare school members for how to proceed in the case of an emergency (Fire Safety Design Requirements for Schools, 2015)[1].

Although the causes of fires are generally broken down into two types: natural and man-made, according to our research, we can say that in Benjamín Aceval the main cause is man-made fires. Our team also identified key limitations for fire prevention, such as the school not having written fire plans, evacuation routes, and most importantly how last year's IQP was unable to work with the community. That is why the main goal of our project was to create fire risk and prevention awareness strategies such as the outreach program for the school and the surrounding communities, and the fire risk clocks and webpage. These strategies aim to educate and improve fire safety awareness not only for the Cerrito school but the communities within Benjamín Aceval.

[1] This source contains information about the fire safety protocols that every school in New Zealand must follow. We felt that the information provided is universal and is relevant to all schools and specifically the Cerrito Agricultural School.

3.0 Methodology

This chapter discusses the main objectives of our research and the methods our team used to achieve them. As a team, we used semi-structured interviews, a survey, and two community outreach methods throughout our project. Additionally, a simplified task schedule is provided at the end of the chapter demonstrating how our team planned and used the above methods.

3.1 Goal Statement

This project focused on improving fire awareness, safety, and prevention for the Cerrito Agricultural School and surrounding communities. These communities included the indigenous Qom, the non-indigenous neighbors, and multiple secondary schools within Benjamín Aceval. These goals were achieved through the following objectives:

1. Assess social and ecological factors increasing and mitigating the risk of fires.
    a. Evaluate social perceptions and practices incentivizing the use of fire.
    b. Identify ecological factors that increase the risk of fires in the community.
2. Understand the current fire preparedness and prevention methods employed by the Cerrito Agricultural School and surrounding communities.
3. Create a comprehensive fire safety program.
    a. Contact community outreach experts.
    b. Earlier detection and prevention of fires.
    c. Increasing fire safety awareness.

3.2 Semi-Structured Interviews

Throughout our research semi-structured interviews were frequently used to achieve our project objectives. This type of interview was useful as it allowed predetermined interview questions to be answered while allowing space for follow-up questions or additional dialogue (Berg & Lune, 2011). Before conducting these interviews, our team received approval from the International Review Board, or IRB, at WPI to ensure the protection of interview participants

and the confidentiality of data collection. These interviews were held in a preferably quiet space on campus during the allotted time in the day.

All interviews began with a team member verbally reciting a pre-written consent waiver to the participant and asking for a verbal acknowledgment of consent from the interviewed participant(s) (Appendix B). After the statement of consent was acknowledged and agreed upon, the interviews began. One team member acted as the primary interviewer, another used recording software to record the interview for later review, and the others took either written or typed notes of the interview. These roles were rotated with every interview to make sure all team members had equal opportunity to interview participants, as well as gain experience. The interview agendas, minutes, and recordings were later organized into a folder based on the participant(s) being interviewed and the date the interview occurred. The interview minutes taken included responses to the predetermined questions, follow up questions and responses, and a miscellaneous section for other relevant details.

To analyze interview results our team would meet and discuss the conclusions and takeaways from conducted interviews. With our project objectives in mind, we would consider how the interview helped us achieve our objective(s) and determine our next course of action.

3.3 Assess Factors Increasing and Mitigating the Risk of Fires

3.3.1 Evaluate Social Perceptions and Practices Incentivizing the Use of Fire

To achieve our first objective to evaluate social perceptions and practices incentivizing the use of fire, our team conducted several interviews during our first weeks in Paraguay. These interviews followed the same guidelines established in section 3.2. The individuals interviewed were school director Prof. Amalio Enciso, former school director José Salomón, and Fundación Paraguaya social workers, Walter Sánchez and Cecilia Monges. The interview questions for each group or individual can be found in the respective Appendices: F, G, and I. Our team chose to talk with these individuals as they all have experience and knowledge of the surrounding communities and their use of fire.

Our interviews with the current and past director of the school provided our team with a great understanding of the school's fire safety protocol, the importance of their eucalyptus

groves, and the cause of fires that occur on campus. Both directors agreed that the main cause of fires on campus came from fires that started in the surrounding communities. They noted that the eucalyptus groves are extremely flammable and are one of the areas most susceptible to fires on campus. The directors mentioned that they believe the school is equipped enough to deal with these fires with their protection methods such as fire extinguishers, *pantallas* made out of rubber used to put out fires, and fire breaks (Appendices F and G). After our interviews we understood that there was a shared concern on the community's misuse of fire and its impacts on the eucalyptus groves on campus.

When speaking with Walter Sánchez and Cecilia Monges our team left with a deeper understanding of the community's relationship with fire and how we can best approach the members of the Qom community. The pair discussed the main causes of fires in the surrounding communities, mentioning trash burning, playing with fire, and burning land for crops. Both Walter and Cecilia agree that the community is not aware of the risks and consequences of fire. This interview helped us determine the format in which we should relay information regarding fire safety to the Qom community based on their cultural practices and Walter's own experience with the Qom.

The information our team gained from these interviews helped to improve our understanding of the causes of fires on campus and how we should deal with this issue based on our target groups.

3.3.2 Identify Ecological Factors that Increase the Risk of Fires in the Community

To identify ecological factors that increased the risk of fires in the community, our team decided to conduct additional interviews with volunteer firefighter Alexis Schreiber, and engineer Raúl Gauto. These interviews followed the same guidelines established in section 3.2 and the interview questions can be found in the respective sections Appendix C and Appendix H. Both interviews included questions regarding the methods they employed to reduce the risk of fire and how the climate in Cerrito lends itself to the propagation of fires. From these interviews our team was able to confirm that winter is the season when most fires occur due to less rainfall and a frost that occurs which makes fields drier and flammable. We also learned about the use of

cows and field pruning to reduce the risk of fire for eucalyptus groves on campus. The information our team learned from these interviews helped to improve our understanding of the ecological factors present in Cerrito that lead to harmful fires.

3.4 Understand the Current Fire Preparedness and Prevention Methods.

In order to complete our second objective which was to understand the current fire preparedness and prevention methods used by the Cerrito Agricultural School and surrounding communities, our team needed to understand the school and the surrounding communities past and current fire safety protocols and fire preparedness methods. To do so, we referenced the previous fire prevention IQP report and referred to the information gained from our interview with Director Amalio Enciso. We learned that the school had fire detection and prevention equipment such as drones, fire breaks, smoke detectors, fire extinguishers and other tools to combat fires. The surrounding communities use *pantallas* as a main method to put out fires. In the case of smaller fires, the community uses water and sand to extinguish the flames. After discussing the fire protocol and prevention methods with Prof. Enciso and Prof. Guerra, it was evident that our priority was not to improve the school's fire prevention methods and instead we needed to work with target groups such as the indigenous Qom community, the United Neighbors of the San José Obrero Neighborhood, and schools in Benjamín Aceval.

3.5 Create a Comprehensive Fire Safety Program.

To create our fire safety program for the Cerrito Agricultural School and the Benjamín Aceval community, we needed to understand the process of community outreach. As a team we researched various community outreach methods and decided on one specific method. This outreach method focused on educating/informing target populations or those who interact with them. This method was created by the Center for Community Health and Development at the University of Kansas (Community ToolBox, n.d.). We found that this methodology was the most applicable to ours as we wanted our program to target not only the Cerrito School, but the surrounding community who interact with them.

There are two main forms of outreach used within this method, instructional and informational. Informational outreach focuses on the type of information being spread whereas instructional outreach focuses on how you deliver information. The informational outreach we used for our fire safety program were fire risk assessment clocks and fire safety workshops (3.5.2). The instructional outreach we used was forming a fire safety committee at the Cerrito Agricultural School to spread awareness on the risk of fires and maintain the school's fire prevention strategies (3.5.3). With these two main outreach methods we were able to create a comprehensive fire safety program for the Cerrito School and those living in Benjamín Aceval.

3.5.1 Contact Community Outreach Experts

To create our community outreach program contacting experts in the field of community outreach was important. The community outreach expert we first spoke to was Stacie Brimmage, a member of the Regional Environmental Council (REC) in Worcester Massachusetts. The REC is a non-profit organization which focuses on food justice in low-income communities through community outreach programs[2]. As a team we conducted a semi-structured interview with Stacie Brimmage via phone call (Appendix E). This interview allowed us to discuss various approaches to community outreach when dealing with underrepresented low-income communities. The discussion provided information regarding how to create a feasible program, effectively implementing an outreach program, and the types of deliverables that can come out of an outreach program.

To understand how we should conduct our community outreach we utilized information from our previously mentioned interview with Walter Sánchez and Cecilia Monges (3.3.1). Sánchez and Monges were of key interest to us as they worked directly with one of our target groups for our fire safety program, the Qom community. The two have worked with the Qom community for four years building a relationship of trust and understanding through their implementation of the poverty stoplight program. As a team we also conducted a joint interview

[2] Although the REC does not focus on fire safety they do extensive community outreach for low income communities in Worcester, Massachusetts. This is applicable to our project as we will be conducting community outreach with low income groups as well. Reaching out to an expert in this field from the REC will be helpful.

with Sánchez and Prof. Enciso to understand how we should approach the topic of fire safety with the Qom community (Appendix J). These interviews provided us with a deeper understanding of the Qom community including their relationship with fire, their understanding of the risks and consequences of fire, and how we should format our fire safety and prevention workshops to be interesting and comprehensible for them.

Figure 7

Interview with Walter Sánchez and Amalio Enciso

Note. Photo taken from our interview with Eng. Walter Sánchez and Prof. Amalio Enciso

3.5.2 Earlier Detection and Prevention of Fires

Detecting and preventing fires earlier for the Cerrito School was a primary goal for the creation of our project. To accomplish this our team conducted research into fire risk assessment clocks and websites to calculate the current fire risk. From our research, we discovered both the Platorand Area Fire Prevention Association (PAFPA) and OpenWeather. The PAFPA was helpful to our project as we were able to reference their Fire Danger Index when developing our fire clocks and website. In particular, the index helped our team to decide on the colors to include on the sign and website, and the weather factors used to calculate the daily fire risk. Our team was able to reach out to a representative at the PAFPA to get a better-detailed breakdown of their fire risk calculator (for more detail see 4.1.2). Additionally, our team found OpenWeather, an API (Application Programming Interface) that would allow us to access information in software that has already been written. Our team employed OpenWeather to

gather weather data such as wind speed, humidity, and temperature from other weather websites. This sampled information was then used in our own website to calculate the current fire risk.

3.5.3 Increasing Fire Safety Awareness

To increase awareness about the risks of fire on campus and in the community, we created a fire safety committee at the Cerrito School. To do so we sent out semi-structured surveys to the students at the school. These surveys contained five closed-ended questions with one free response and were used to gauge student interest in being a member of the committee (Appendix D). These survey responses were not shared with other students, only selected faculty. After the surveys were completed, the data was analyzed using statistical methods, such as descriptive statistics and inferential statistics, to identify patterns and trends in the responses. We received twenty-six survey responses and selected ten students based on their availability, desire to learn, and interest in fire safety and awareness. The primary responsibilities of the committee were to spread fire safety awareness to the United Neighbors and Qom communities as well as four schools in Benjamín Aceval.

The committee consistently met on Mondays at 8 pm for one-hour sessions. The first three committee meetings were used to train the students on the causes and risks of fire to highlight the importance of fire safety. Within these meetings, we created a fire safety training presentation (Appendix T) and we taught the members information on the meaning and how to use our fire risk assessment signs and website. We designed the committee presentation to include fire safety content such as a brief history of the increase of fires in Paraguay, safety and prevention methods, the risks and consequences of fire, and how we can improve fire safety in the community. Each meeting and presentation prepared the students to give fire safety and prevention workshops to our target communities and schools. To improve the quality of the workshop we individually met with students who would be conducting the fire safety presentation and had them practice with us before entering the community.

In addition to the training presentations, during our third committee meeting, we invited previously mentioned volunteer firefighter Alexis Schreiber to lead a workshop with the committee. This workshop described the causes of wildfires in Paraguay, specifically Cerrito, the

importance of fire safety, and which audiences we should be targeting with our workshops (3.3.2). Schreiber emphasized that the common causes of fires are trash burning and setting fires out of boredom. This workshop was helpful for the students' understanding of their goal as a committee and how they can improve fire safety in their community.

3.6 Weekly Breakdown

Mon 3/20-Fri 3/24		Mon 4/10 - Fri 4/14	
When	What	When	What
3/21	Interview with Social Workers	4/12	Interview Firefighters
3/23	Survey students for fire committee selection	4/12	Third Committee Meeting (Firefighter Visit)
Mon 3/27-Fri 3/31		Mon 4/17 - Fri 4/21	
When	What	When	What
3/27	Interview with Raul Gauto	4/18	Visit Colegio Domingo Masi
3/28	Interview with Professor Amalio	4/18	Visit Colegio Nacional San Francisco de Asís
3/28	Interview with José Luis Salomón	4/18	Visit latino paraguayos
3/28	form committee/reach out to students	4/20	Visit Qom Community
3/29	First Committee Meeting	4/21	Visit Escuela Básica N°4098 Rosarino
Mon 4/3 - Wed 4/5		Mon 4/24 - Fri 4/28	
When	What	When	What
4/3	Second Committee Meeting	4/24	Visit Colegio Domingo Masi
		4/24	Final Committee Meeting
		4/25	Received Final Fire Safety clocks
		4/25	Website Published
		4/26	Visit Colegio Nacional Cerrito
		4/27	Gave Committee Fire Safety Certificates
		4/28	Fire Safety clocks Given to the School
		4/28	Picked Mural Contest Winner

3.7 Ethics and Informed Consent

Getting international review board (IRB) approval is a crucial step in ensuring that research studies are conducted ethically and with respect for the participants involved. In our case, our group went through the IRB approval process at Worcester Polytechnic Institute in order to conduct a survey, interviews, and a vulnerability study. This involved submitting a detailed research protocol that outlined the study's purpose, methodology, and potential risks and benefits to participants. The IRB reviewed our protocol to ensure that our study met ethical standards and that all participants' rights and safety were protected throughout the research process. By obtaining IRB approval, our group can be confident that our study was conducted with integrity and respect for the participants involved.

Ensuring the privacy and safety of study participants is an important aspect of any research study. Our group took some measures to protect the confidentiality of information gathered through the survey, interviews, and vulnerability study. This included obtaining informed consent from participants, ensuring that data was stored securely within our cabins, and not obtaining names unless they have interest in participating on our outreach committee. By taking these steps, our group can ensure that the information gathered through the survey and interviews was kept private and safe, and that participants' confidentiality and privacy are respected.

4.0 Results, Recommendations and Conclusions

This chapter will describe our two main deliverables, installation of fire risk safety clocks, and a community outreach program, and sub deliverables we provided to the Cerrito Agricultural School after our seven weeks of consultation. This section also includes our recommendations for how the school can continue to improve fire safety with individual comments to the school and the fire safety committee. We finish this section with the conclusion of our project summarizing how our fire risk safety clocks and community outreach program have helped the community and can continue to support the school in creating more awareness around fire prevention.

4.1 Fire Risk Assessment Clocks

4.1.1 Risk Assessment Clocks

Our first deliverable was our fire risk assessment clocks. We made three clocks that each contained four fire risk levels: bajo (low) in green, medio (medium) in yellow, alto (high) in orange, and extremo (extreme) in red (Figure 8). On each sign with the fire risk clock there is a QR code linked to our risk calculator website which determines the daily risk of fire (4.1.2). The clocks have an indicator that can be moved to one of the four fire risk levels to display the risk of fire for that day. The sign also includes the number of the volunteer fire department, 132, to call in case of a fire. We sent our sign design to Fundación Paraguaya to print them and they were able to cover the costs. We recommended that the three clocks be placed in three different areas, the main entrance to the school, the entrance to the Qom community, and in front of a nearby store called Vagos.

The signs were made out of a metal frame with the clock design printed on a piece of vinyl on top. The indicator mechanism was made using a piece of wood cut into the shape of an arrow and a piece of wood on the back of the sign for support. The indicator was attached to the sign with a eight millimeter (mm) hex bolt, three eight mm metal washers, and two eight mm hex nuts. The mechanism was assembled by placing one metal washer on the bolt followed by the arrow, then a hex nut followed by a metal washer. That assembly was put through a hole on the

sign and the back piece of wood. We placed the final metal washer and secured it all down with the hex nut.

Figure 8

Fire Risk Sign

Note. Photo taken by our groupmate displaying our fire risk assessment clocks.

4.1.2 Risk Calculator Website

To use the fire risk assessment clocks, our team created a website to show the current fire risk at any point of the day. From the information we received, we were able to come up with the following equation to calculate the current fire risk: fireRisk = 0.2 * currTemp - 0.3 * humidity + 0.25 * windSpeed + 0.25 * (100 - rainfall). The factors it uses include humidity, rainfall in the last 24 hours in millimeters, current temperature in Celsius, and wind speed in kilometers per hour (Platorand Area Fire Prevention Association, n.d.). The website uses the OpenWeather API (discussed in 3.5.2) to gather weather information for Benjamín Aceval to accurately predict the fire risk for Cerrito. The only required user input for the website was the amount of rain that had occurred in the past 24 hours in millimeters.

In the middle of the screen on the website there is a box that shows the color of the risk corresponding with the colors on the sign. Within this box we display the risk level, the description of what that particular risk level means, as well as the current temperature, humidity, wind speed, and rainfall. Examples of each risk level and their descriptions can be found in Appendix V. Like the sign, the website also displays the number to call in case of a fire. The

website was published to the Fundación Paraguaya website and we made a QR code to put on the signs so the website can be easily accessed so that whoever is changing the indicator of the sign knows what the current fire risk level is. In order to access the website, go to: http://www.hotelcerrito.com.py/riesgoforestal/.

Figure 9

Fire Risk Website

Note. Photo of our fire risk calculator website.

4.2 Community Outreach Program

4.2.1 Fire Safety Committee

For our second deliverable the community outreach program, we created a fire safety committee at the Cerrito school. In the beginning we selected 10 students for the committee, but two more students were recommended to us and joined afterwards. The committee received training in fire safety and prevention through presentations we created for them and a workshop with volunteer firefighters (Appendix T). The students were able to test their learned knowledge with a game of kahoot based on fire safety topics (Appendix U). The 12 group of students represent the first committee of its kind at the Cerrito school. This committee is important as it

creates installed capacity within the school as the committee members are from varying grades, and we implemented leadership roles such as president, secretary, and educator. Not only are the students aware of the importance of fire safety and prevention but they are also eager to continue this conversation and work with members of the community. All of the workshop content and contacts are available to the committee for future use.

Towards the end of our time in Paraguay we had a celebration with the students on the fire safety committee to thank them for all their hard work on the seven community workshops they helped us carry out. During our final presentation at the school we gave each of the students a certificate in fire safety and prevention to represent their work over the course of our project (Appendix R). We also presented the committee president Micaela Arevalos with a curriculum/action plan that they can use to continue the committee's activities once we leave Paraguay. This curriculum consists of activities and tasks that they can do to better prepare the community and the school for fire preparedness and awareness.

Figure 10

Fire safety committee and volunteer firefighters

Note. Photo taken of our committee with the volunteer firefighters from Benjamín Aceval

4.2.2 Community Workshops

From April 18th to April 26th, we conducted seven fire safety and prevention workshops with five school visits and two community visits (See section 3.6) We introduced two workshops into Colegio Domingo Masi reaching grades four through nine, one workshop in Colegio

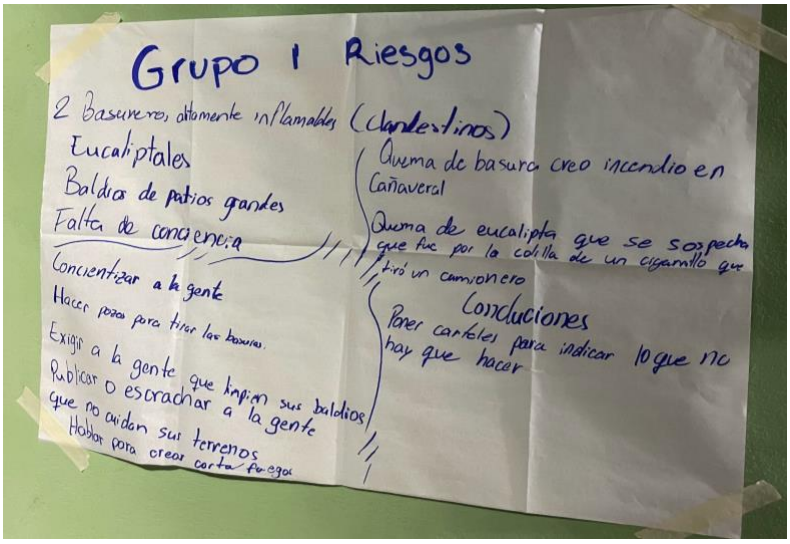
Nacional San Francisco de Asís grades four through nine, one workshop in Escuela Básica N°4098 Rosarino grades seven through nine, and one workshop in Colegio Nacional Cerrito grades seven through nine. Each workshop consisted of a fire safety and prevention presentation (Appendix M), and was accompanied with a fire safety activity. The duration of the workshops lasted an hour on average. The outline of these workshops can be found in Appendix K.

We had two activities prepared for the schools, a fire safety bingo and a fire safety pictionary game. The bingo activity used a list of forty words in Spanish related to fire safety. These words were put into a bingo card generator which created varying bingo templates for the students. The fire safety pictionary included a list of words in Spanish related to fire safety, with the objective of students drawing out the word and having other students guess the image (Appendix K). After our first workshop with Colegio Domingo Masi we found that the bingo activity worked the best for student participation and workshop duration, with this we continued using bingo for all the schools we visited. We were able to reach grades 4 through 9 with these workshops, using the same presentation and activities for each session.

For the two communities we visited we worked primarily with adults. These workshops varied from the workshops given to the students because of our inclusion of fire safety discussions. Before our workshop with the Latino Paraguayo community we created workshop flyers to inform them of the topic of the workshop, when we were meeting, and where (Appendix P). On April 18th we conducted our workshop with the community showing the group our fire safety and prevention presentation (Appendix M). For this workshop we had created three groups of questions based on fire safety principles, the three groups being risks, consequences, and awareness. After the presentation we split the participants into two groups of the three groups having one group answer one set of questions, and the other group answer the second set of questions (Appendix L). We wrote the responses to the questions on paper for the community to visually see and take photos of (Figure 11 and 12). To end off the activity we answered a third set of questions as an entire group.

Figure 11

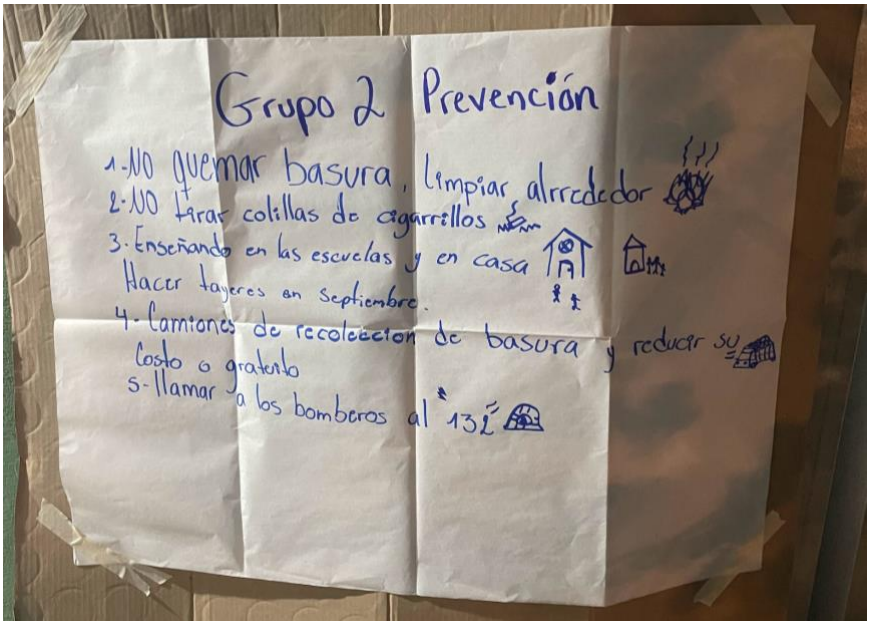
Group 1 Risk Responses



Note. Photo taken of responses from group 1 of the risks category.

Figure 12

Group 2 Prevention Responses



Note. Photo taken of responses from group 2 of the prevention category.

When working with the Qom community our team utilized Walter Sánchez due to his strong relationship with the community. We began with an introduction from Walter and Amalio Enciso emphasizing the importance of the workshop. We then presented our fire safety and prevention presentation leaving time for students to pause videos and explain concepts in depth (Appendix N). For this workshop we encouraged committee members to speak in Spanish and Guaraní to ensure that members of the Qom were understanding the information within the presentation. To conclude our workshop we ended with a group discussion led by Walter on the issues of fire in their community (Appendix N).

As a team we conducted a mural design contest to see which student could create an effective fire safety mural idea for the Qom community. To do so, we created a flyer which contained the information of the contest rules, location, and deadline (Appendix Q). We received mural submissions on April 26th and determined that the winner of the contest was Gabriela Medina. The submission relayed the importance of fire safety, but we recommend that the committee, alongside the help of Walter Sánchez and Prof. Amalio, adjust the design so that it is more related to the Qom community. The prize of 100,000 guaraní was given to Gabriela as well as our recommendations on the design.

Figure 13

Mural Design for the Qom

Note. Photo of the winning mural submission by Gabriela Medina

Figure 14

Workshop at Colegio Nacional San Francisco de Asís

Note. Photo of our workshop with students at the Colegio Nacional San Francisco de Asís

Figure 15

Workshop at Colegio Domingo Masi

Note. Photo taken from our workshop with students at Colegio Domingo Masi

Figure 16

Workshop with Latino Paraguayan Community

Note. Photo taken from our workshop with the San José Obrero community

Figure 17

Workshop with Qom community leaders

Note. Photo taken of our fire safety workshop with the Qom community

4.3 Recommendations

Our main recommendation as a team is that the Cerrito School continue to improve fire safety awareness at the school, surrounding communities, and other schools in Benjamin Aceval. We could not fully solve the issue of the lack of fire safety awareness in 7 weeks. This will be a

continuous effort which requires the participation of all groups who contribute to fires and are affected by fires.

4.3.1 Recommendations for the Committee

One tool the school can use to improve fire safety is to take advantage of the existence of the student fire safety committee. The committee played a crucial role in discussing the importance of fire safety and prevention with the community, and this conversation should be continued. This is why we recommend that the fire safety committee continue its activities after our departure from Paraguay. We recommend that the committee members follow a year-long curriculum we have created for them which includes monthly activities and goals (Appendix S). They do not need to follow the curriculum exactly, but we encourage them to use most of the activities we have proposed, in order to continue spreading fire safety awareness.
Such activities include:

1. Create a written fire protocol for the director of the school
2. Organize a school fire drill
3. Paint a fire safety mural with the Qom community
4. Create a list of fire safety equipment and documentation
5. Create an emergency contact list and evacuation route
6. Maintain/update daily the 3 fire risk assessment clocks on campus
7. Work with the volunteer fire department to continue to impart fire safety education at the Cerrito School and the surrounding community

We also recommend that the fire safety committee continue to do fire safety and prevention workshops with the four schools we have visited, as well as branching out to other schools in the area. We have created materials for three different types of workshops for the committee, for various age groups including young children, middle schoolers-highschoolers, and adults. The committee can continue to impart these workshops, using the presentations and activities we have created. During our time in Cerrito, we were not able to meet with children in third grade or below. We recommend that the committee meet with this target group in the future. Additionally, the fire safety committee students could host a fire safety and prevention

workshop with students and professors at the Cerrito Agricultural school, inviting volunteer firefighters to attend/lead the workshop. These workshops are the first of its kind at the Cerrito school and proved to be helpful in understanding the risks and consequences of fires.
To ensure the success of the committee we recommend that the committee vote on leadership roles annually such as president, treasurer, and secretary. We recommend the leadership roles be as follows:

1. President - Must lead and direct the committee and ensure that all committee tasks are being met.
2. Secretary - Must keep documentation of committee meetings and will create committee agendas.
3. Educator/Researcher - Must create new curriculums for the committee to follow and educate new committee members.

The committee should also recruit new students annually to ensure the committee remains an active and vital part of the school. To recruit new members the committee can use the survey we created to select members of the committee (Appendix D). We also recommend that a Cerrito School professor oversee and guide the committee's tasks to ensure that the committee is meeting at least once a month to continue spreading awareness. This professor should also be responsible for ensuring that the committee is not disbanded. The local volunteer fire department could be a great resource for the fire committee to use, and we encourage that this relationship continues to be fostered.

4.3.2 Recommendations for the School

Through our research it was noted that the school does not need to improve its fire safety, however we recommend that the school implement a fire safety curriculum. This could either be mandatory fire safety training for students that is carried out annually, or a fire safety course which is taught at the school. When speaking with students at the school, it was apparent that there is still an unsureness of what to do in case of a fire. Having a fire safety curriculum or training could prove to be beneficial for the lives of the students. This training could either be conducted by the student fire safety committee or in collaboration with the local volunteer fire

department. We encourage the Cerrito School to continue to foster a relationship with the fire department which could include field trips to the fire department and workshops.

An additional idea we would encourage the school to use is that of creating a Fire Safety Week at the school which could occur during the peak fire season. This Fire Safety Week could include daily fire safety activities to remind people about the risks and consequences of fires. This could be a potential task for the fire safety committee and could also be an event open to the surrounding communities. This relationship with community members was helpful within our project and should be built upon. Throughout our research we identified trash burning as being one of the main causes of uncontrolled fires. Partnering with community members to conduct trash clean ups could potentially help with the issue of trash burning. The opinions and ideas of community members is a useful tool to improve fire safety in the community and should continue to be utilized.

There are currently three fire risk assessment clocks installed at the school, but we would suggest that more clocks be installed in other areas in the surrounding community. These clocks should also be installed on the campuses of other nearby schools in the future. We encourage members of the student fire committee to check the clocks at least once in the morning and once in the afternoon (using the website we have created) to ensure they are as accurate as possible. If the committee is not able to check the clocks, the Cerrito School professors should be able to change the risk levels on the clocks as well. The risk level on the clocks must be changed manually but a future recommendation could be to create clocks that update automatically, thereby ensuring that they are accurate 24/7.

4.4 Conclusions

The goal and objectives of our project were successfully achieved through the use of two forms of outreach, instructional and informational. These two outreach methods were part of a community outreach method created by the Work Group for Community Health and Development at the University of Kansas. This outreach method focused on educating/informing target populations or those who interact with them. As a team we used the instructional outreach method by creating the fire safety committee at the school. The informational outreach we used

was creating our fire risk assessment clocks and with the creation of our three different fire safety workshops. These two methods allowed us to inform our target groups and those who interact with them on the importance of fire safety awareness.

In closing, the issue with fire in Paraguay will take time and effort to solve. What we do know is that spreading awareness on the risks and consequences of fire is essential in addressing this issue. The creation of the student fire safety committee, along with the fire risk assessment clocks and fire safety workshops will give the Cerrito Agricultural school multiple ways to spread awareness on fire safety. The solutions we created will provide a foundation for the school to improve fire safety on the campus and in the community. It has been noted through our research that the school's issue with fire does not originate from the school itself, but rather, through the community's lack of awareness. Solutions that spread awareness on fire safety to multiple demographics in various forms are possible. As fires are on a steady increase in Paraguay, the Cerrito School should use these solutions to bring about a positive change in terms of the issue of fires in Benjamín Aceval.

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Appendices

Appendix A: Sponsor Description

The Cerrito Agricultural School is located in the small rural town of Cerrito, Paraguay, is a financially self-sustaining school, with the motto of, “Soña, despertá , actuá” (Diario ABC Color, 2015). The school focuses on teaching students the valuable skills of entrepreneurship, agriculture, and self-sustainability, where graduating students will receive diplomas as technicians in agriculture, and in hospitality and tourism (Tose et al., 2016). The school alternates between classroom learning and hands-on trade skills involving agriculture and business (Jilani et al., 2015). The Cerrito School has made a significant impact on the lives of those who attend and has shown great success in self-sustainability, one article stating that, “The school has been able to cover the full cost of its operations, earning more than US $300,000 annually.” (Grizio, 2018).

However, the Cerrito School has not always been this successful. Prior to 2002, the school experienced extreme cuts in government funding as well as a large decline in enrollment numbers. The school struggled to pay teachers and had difficulty affording the costs of maintaining the farm. Luckily, in 2002, the Cerrito School was transferred to Paraguay’s first microfinance institution, NGO Fundación Paraguaya (established in 1985), in an attempt to revamp and transform the school (Grizio, 2018). This new leadership proved to be beneficial, allowing the school to subsidize student tuition, room and board. Fundación Paraguaya, with their founder Martin Burt, created and implemented a financially self-sustainable school model, birthing the successful Cerrito School that we now know. The Cerrito School is one of 3 Paraguayan schools to implement the financial self-sustainable school model, and there has been a commitment to implement this model in over 50 schools globally.

Fundación Paraguaya is an organization that has 12 primary team members including founder and CEO, Martin Burt as well as 11 members of their board of directors. They have more than 30 locations where their programs are located, one of which being the Cerrito Agricultural School. The organization’s main focus is poverty with their poverty elimination traffic light. The program has reached 20 countries where over 200 organizations use the

program. The poverty traffic light helps to show how poverty is measured (Delareyna, 2020). Their programs have reached more than 44 countries across the world just in 2021 alone. They have surveyed more than 220,000 people about the elimination of poverty (Fundación Paraguaya – Fundación Paraguaya).

However, a problem facing the Cerrito Agricultural School is the increase in wildfires in the area and the issues they pose to faculty, students, and the surrounding community. In recent years wildfires have become an increasingly dangerous issue in Paraguay, given a 376% increase to area burned in the Pantanal region in 2020 as compared to the averages from the prior two decades (Garcia et al., 2021, p. 3). In particular, fires pose an issue to the Cerrito Agricultural School in general due to high winds, droughts, and recent weather conditions that resulted in low humidity (Coppola, 2015). This affects the school as these fires disrupt ongoing agricultural practices as well as endangering faculty, students, and neighbors. Which in turn hampers the school's capacity to be self-sustainable and to provide a safe learning environment for all of those involved in activities on campus. Overall, by working closely with Fundación Paraguaya and the Cerrito Agricultural School our team plans on improving fire prevention and preparedness methods to help create a safer learning environment on campus.

Appendix B: Interview Consent Statement

English…

We are a group of students from Worcester Polytechnic Institute in Worcester Massachusetts. As a team we would love it if you joined us for an interview for our research in creating a community outreach program for fire prevention. This community outreach program will take place here at the Cerrito Agricultural School, where students will enhance their understanding of fire safety and fire preparedness. From this interview the information we hope to gain is [dependent on the interview]. The interview should last no longer than 20 to 30 minutes and is completely optional. If we are granted consent this interview will be recorded via audio recording, and we will have someone writing down your responses. If you do not feel comfortable answering any questions, please let us know and we will gladly move on through

our interview. Once our research is completed our report will be published in a publicly available academic document. You can access this document online or we can send you a copy once it's published. Your participation in this interview would be greatly appreciated but as a reminder is completely voluntary. Let us know if you have any questions regarding this interview or if you prefer your name not to be included.

Spanish…

Nosotros somos un grupo de estudiantes de Worcester Polytechnic Institute en Worcester, Massachusetts. Como equipo, nos encantaría que se uniera a nosotros para una entrevista para nuestra investigación sobre la creación de un programa de alcance comunitario para la prevención de incendios. La programa alcance comunitario tomará lugar aquí en la Escuela Agrícola Cerrito, dondé los estudiantes mejorarán su comprensión de seguridad contra incendios y preparación contra incendios. De esta entrevista la información que esperamos obtener es [depende en la entrevista]. La entrevista no debe durar más de 10 minutos y es completamente opcional. Si nos da el consentimiento, esta entrevista se grabará a través de una grabación de audio y alguien escribirá sus respuestas. Si no se siente cómodo respondiendo alguna pregunta, háganoslo saber y con gusto continuaremos con nuestra entrevista. Una vez que se complete nuestra investigación, nuestro informe se publicará en un documento académico disponible públicamente. Puede acceder a este documento en línea o podemos enviarle una copia una vez que se publique. Su participación en esta entrevista sería muy apreciada, pero como recordatorio, es completamente voluntaria. Háganos saber si tiene alguna pregunta con respecto a esta entrevista o si prefiere que su nombre no sea incluido.

Appendix C: Local FireFighters Interview Guide

1. ¿Existen programas educativos para las comunidades locales en Benjamín Aceval sobre la seguridad contra incendios? De ser así ¿podría describir en qué consisten? ¿Dónde, cómo y cuándo se realizan?
2. ¿Ha respondido alguna vez a un incendio aquí en Cerrito?
3. ¿A qué tipos de emergencias de incendio responde su equipo de bomberos?

4. ¿Utiliza o conoce algún método para determinar el nivel de riesgo de incendio (en el día a día) en la zona de Cerrito? ¿De ser así, qué criterios tiene en cuenta para determinar el nivel de riesgo?
5. ¿Cuáles son los orígenes o causas de incendio más comunes en la zona de Cerrito?
6. Aproximadamente ¿cuántos incendios hubo en Cerrito durante los últimos 24 meses que requirieron la atención de los bomberos, o que fueron apagados por vecinos?
7. ¿Cuáles son algunos métodos de prevención de incendios que existen en la comunidad en la actualidad, o que debamos recomendar a la comunidad?
8. ¿Su equipo de bomberos voluntarios trabaja con otros servicios de emergencia locales como la policía para atender a llamadas de emergencia por incendios?
9. ¿Tiene Ud. alguna sugerencia sobre información relevante que sería importante compartir con las comunidades aledañas (Qom, comunidades vecinales, escuelas) para la concientización sobre la prevención de incendios?
10. Además de la visita de hoy a la Escuela Cerrito ¿estaría dispuesto a dar otra presentación sobre seguridad contra incendios a los estudiantes aquí en la escuela agrícola Cerrito?
11. ¿Qué opina sobre el "reloj de nivel de riesgo de incendio" que nuestro equipo estudiantil estamos creando para crear conciencia en la comunidad sobre el riesgo de incendios forestales? (le vamos a mostrar el diseño del mismo)
12. ¿A qué número sugiere Ud. que llamen las personas para reportar un incendio fuera de control?

Appendix D: Survey Questions for Cerrito Students

¿Te gusta trabajar con la comunidad? ¿Te interesa el tema de la prevención de incendios? Sí la respuesta es sí, por favor completa esta encuesta. Queremos formar un comité de prevención contra incendios en la Escuela Cerrito.

Nombre: _____ Grado/Curso: _____

1. ¿Crees que los incendios en la escuela y la vecindad de la escuela son un problema?
    a. Sí
    b. No
2. ¿Te gusta trabajar en equipo y te gustaría liderar actividades con los estudiantes de la escuela y las comunidades cercanas?
    a. Sí
    b. No
3. ¿Te atrae la idea de hablar enfrente de diferentes públicos sobre la prevención de incendios?
    a. Sí
    b. No
4. ¿Tendrías tiempo para reunirte regularmente con el comité de prevención de incendios durante la semana (fuera del horario de clases)?
    a. Sí
    b. No
5. ¿Está interesado/a en aprender más sobre prevención de incendios y enseñarles a otros?
    a. Sí
    b. No
6. En caso afirmativo, describa por qué:

Appendix E: Expert, Stacie Brimmage, Interview Guide

1. In your experience, what are some of the most important factors in creating successful community outreach programs, and how do you measure the impact of those programs?
2. How do you learn about issues in the community, and what resources do you rely on to keep your knowledge up-to-date?
3. Can you share an example of a particularly successful community outreach project you have been involved in, and what made that project successful?
4. How do you collaborate with other organizations, stakeholders, and community members to ensure that your outreach efforts are successful?
5. What advice would you offer to someone who is interested in community outreach and engagement?

6. Do you have any advice in regards to any language or cultural barriers when trying to make a community outreach program?

Appendix F: Cerrito Director, Amalio Enciso, Interview Guide

1. ¿Con qué frecuencia ocurren incendios en la escuela y fuera de la escuela, y qué tan severos son los incendios?
2. ¿Cuáles son las principales causas de estos incendios dentro y fuera de la escuela?
3. ¿Cuenta con protocolos contra incendios escritos/documentados a seguir en caso de incendio?
4. ¿Saben los alumnos qué hacer en caso de incendio?
5. ¿Considera necesario hacer otro simulacro de incendio en la escuela, similar al que se hizo el año pasado?
6. ¿Podemos trabajar con los bomberos para crear un programa de concientización contra incendios? ¿Cómo podemos contactarlos?
7. ¿Que estás haciendo para proteger los eucaliptos en el campus?
8. Según dónde se coloquen los carteles, ¿deberían estar en diferentes idiomas?
9. ¿Con quién o con qué empresa debe trabajar nuestro equipo a la hora de realizar estos carteles? ¿Cómo podemos contactarlos?
10. ¿Cuándo y con qué frecuencia estaría dispuesto a cambiar los signos de fuego?
11. ¿Tiene un presupuesto para este proyecto?
12. ¿Cuáles son sus expectativas del comité de incendios?
13. ¿Cuándo cree que debería reunirse el comité de seguridad contra incendios y con qué frecuencia?
14. ¿Hay miembros del personal docente o administrativo dispuestos a ser parte del comité de prevención contra incendios?
15. ¿Tiene alguna otra sugerencia o comentario sobre su proyecto hasta ahora?
16. ¿Tiene tiempo para mostrarnos dónde quiere los carteles de incendio y algunas áreas de riesgo de incendio? Si no, ¿podemos encontrar un momento para hacerlo?

Appendix G: Previous Cerrito Director, José Luis Salomón, Interview Guide

1. En su opinión, ¿cuáles son las causas de los incendios en el campus?
2. ¿Qué protocolo de seguridad contra incendios ha habido en el pasado en esta escuela?
3. ¿Qué medidas tomó usted como anterior director de la escuela para mitigar y hacer frente a los incendios?
4. ¿Con quién trabajó para mejorar la seguridad contra incendios aquí en la escuela?
5. ¿Hubo algún esfuerzo mientras usted era el director de la escuela para comunicar a los qom los peligros que representan los incendios?

Appendix H: Raul Gauto Interview Guide

1. Could you tell us more about your occupation and experience in protecting eucalyptus groves from fires? What are some of the biggest challenges you have faced in this area, and how have you overcome them?
2. What are some of the common methods you use to prevent fires in/protect eucalyptus groves? Are there any particular methods you've found to be more effective than others?
3. How do you approach communicating with people who may speak a different language than you, especially when it comes to your job? What strategies have you found to be effective in getting your message across?
4. Have you worked with the Cerrito agricultural school before? If so, can you tell us more about the specific work you completed for the school?
5. Do you work by yourself, with a team, or with a local organization (like the volunteer firefighters) to facilitate the completion of projects?
6. Can you give us some specific suggestions on how the Cerrito Agricultural school can work with the Qom community to prevent fires? Can you give us some specific suggestions on how to work with latino paraguayo neighbors of the school to prevent fires?

7. What is the minimum amount of equipment and training the Cerrito Agricultural school staff should have, to fight fires?
8. Do you think that the school should have "fire drills" pretending there is a fire in the eucalyptus plantation? If so, what would that drill entail, in your mind?

Appendix I: Social Worker Interview Guide

1. ¿Cuáles son sus funciones en la Fundación Paraguaya?
2. ¿Cuánto tiempo llevas trabajando con la comunidad Qom?
3. ¿Qué nos puedes decir sobre la comunidad de Qom?
4. ¿Qué consejo nos daría para trabajar con la comunidad Qom?
5. ¿Cuál es la mejor manera de dar información a la comunidad Qom?
6. ¿Qué trabajo has hecho en la comunidad Qom?
7. ¿Qué trabajo estás haciendo ahora en la comunidad de Qom?
8. ¿Cómo usa el fuego la comunidad Qom?
9. ¿La comunidad de Qom tiene algún protocolo de seguridad contra incendios? ¿En ese caso están escritos los protocolos contra incendios?
10. ¿Cuál es la mejor manera de aproximarnos a la comunidad para trabajar con ellos en la prevención de incendios?
11. ¿Piensan que podríamos hacer visitas a las familias?
12. ¿Sería una buena idea instalar mensajes contra incendios dentro de los predios de la comunidad?
13. ¿Tienen algunas ideas o sugerencias para hacer un trabajo de concientización contra incendios con la comunidad qom?

Appendix J: Amalio Enciso and Walter Sánchez Interview Guide

1. ¿Cuáles son algunos riesgos de incendio que cree que serán importantes para explicar a la comunidad de Qom?
2. ¿Qué se ha sugerido a la comunidad Qom como alternativa a la quema de basura? ¿Han tenido éxito estas alternativas en alguna capacidad?

3. ¿Podría describir la capacitación realizada hasta ahora con la comunidad de Qom para la seguridad contra incendios? ¿Cómo presentó la información? ¿Hay algún procedimiento de incendio formalizado con la comunidad?
4. ¿Cómo crees que nuestro equipo debe presentar la señal de riesgo de incendio que crearemos a la comunidad de Qom para que sea entendida, respetada y utilizada correctamente?
5. Nuestro equipo desea distribuir folletos de seguridad contra incendios a la comunidad, ¿hay alguna información que crea que sería beneficioso tener en ellos?
6. ¿Cómo se siente acerca de nuestro equipo trabajando con los estudiantes de agricultura de Cerrito para difundir información sobre seguridad contra incendios? ¿Es este un buen paso o hay algo que deberíamos considerar de antemano?
7. ¿Cuáles son algunos pasos que cree que nuestro equipo debería tomar para mantener una buena relación con la comunidad Qom y la escuela Cerrito para que puedan trabajar juntos en la seguridad contra incendios? ¿Ayudarían las reuniones programadas regularmente, la capacitación, etc.?
8. ¿Tiene alguna pregunta, comentario o sugerencia adicional para nuestro equipo?

Appendix K: School Workshop Outline

Taller de seguridad contra incendios para niños mayores

Fecha : 18/4/23
Objetivo del taller : Enfatizar la importancia de la seguridad contra incendios en nuestra comunidad objetivo.

Hora :	**Artículo** :	**Tema** :
2	**Bienvenida- Inicio del taller** ● Un miembro de WPI dará la bienvenida a todos y comenzará el taller. explicaremos nuestro objetivo del taller y porqué es importante.	
10	**Presentaciones- Introducción al Taller** ● Presentarnos a nosotros mismos y al comité. ● Haga que los miembros de la comunidad se presenten	

● Lea nuestra agenda para el taller (Comenzaremos con una pregunta, haremos nuestra presentación de seguridad contra incendios, haremos dos actividades y concluiremos nuestro taller.)
● Comience el taller con una pregunta de apertura para la comunidad sobre la seguridad contra incendios: "¿Cuál cree que es la causa de la mayoría de los incendios en su comunidad?"

10 **Presentación de Powerpoint: la importancia de la seguridad contra incendios**

● Tabla de contenido de la presentación
● ¿Cuáles son los principios de seguridad contra incendios?
● ¿Cuáles son las causas y los riesgos de los incendios?
● Video corto sobre seguridad contra incendios.
● ¿Por qué es importante la seguridad contra incendios?
● Conclusiones de la presentación

15 **Juego de bingo**

● Entrega cartones de bingo a cada alumno
    ○ En las tarjetas de bingo habrá palabras de seguridad contra incendios.
● Llamar palabras (después: explicar las palabras)
    ○ Si los alumnos tienen la palabra en su hoja la marcarán con rotuladores
● Repita hasta que haya un ganador, el estudiante gritará Bingo si tiene 5 a lo ancho/abajo/en diagonal
● Dar premio al ganador

Palabras: Humo, llamas, Extintor, Bombero, Prevención, Evacuación, Peligro, Seguridad, No quemar, Detector, Combustible, Emergencia, Encender, Manguera, Alarma de humo, Camión de bomberos, Estación de bomberos, Salida de emergencias, Resistente al fuego, Simulacro de incendio, Investigación de incendios, Oxígeno, Equipo de seguridad, Respuesta de emergencia, Seguridad contra incendios, Extinción de incendios, Prevención de quemaduras, Alarma de incendios, Prevención de fuego, llama al 132, Escalera, Incendio forestal, No quemar basura, No quemar pastizales, No jugar con fuego, Fallas en el sistema de electricidad, Riesgos de incendios, Medioambiente, Fósforos, Apagar la fogata, Viento, Agua y arena

Juego adivina el dibujo

- El grupo de estudiantes se dividirá en equipos.
- Cada equipo elegirá a una persona para elegir una palabra de una bolsa, esa persona deberá dibujar esa palabra para que su equipo adivine cuál es.
- El equipo con más puntos después de cada ronda de 1 minuto ganará

Palabras: Fumar, llamas, extintor, bombero, aspersor, manguera, detector de humo, camión de bomberos, estación de bomberos, escalera, incendio forestal, quema de basura, jugar con fuego, casa en llamas, casco, boca de incendio, fuego en la cocina, apagando un fuego, llama al 132, partidos, alta temperatura, vientos fuertes, lluvia, ambiente, hoguera, leña, bosque, chispa.

2 **Conclusión: gracias y pensamientos finales**

- Comparta pensamientos finales con la comunidad
- Pregunta por cualquier duda
- Compartir información de contacto
- Foto de grupo

Appendix L: Comisión Vecinal Workshop Outline

Taller Latino Paraguayo de Seguridad contra Incendios

Fecha: 18/4/23
Meta del taller: Enfatizar la importancia de la seguridad contra incendios en nuestra comunidad objetivo.

Hora:	**Articulo**:	**Tema**:
2	**Bienvenida- Inicio del taller** ● Walter dará la bienvenida a todos y comenzará el taller. ● Explicaremos nuestro objetivo del taller y porqué es importante.	
10		

Presentaciones- Introducción al Taller

- Presentarnos a nosotros mismos y al comité.
- Haga que los miembros de la comunidad se presenten con un juego para romper el hielo
- Hacer que todos se presenten y un dato divertido sobre ellos
- Lea nuestra agenda para el taller (Comenzaremos con una pregunta, haremos nuestra presentación de seguridad contra incendios, haremos una actividad y concluiremos nuestro taller.)
- Comience el taller con una pregunta de apertura para la comunidad sobre la seguridad contra incendios: "¿Cuál cree que es la causa de la mayoría de los incendios en su comunidad?"

10

Presentación de Powerpoint: la importancia de la seguridad contra incendios

- Tabla de contenido de la presentación
- ¿Cuáles son los principios de seguridad contra incendios?
- ¿Cuáles son las causas y los riesgos de los incendios?
- Video corto sobre seguridad contra incendios.
- ¿Por qué es importante la seguridad contra incendios?
- Actividad- Grupos de seguridad contra incendios

10 **Actividad- Grupos de Seguridad contra Incendios**

- Cree pequeños grupos y hágale a cada grupo preguntas sobre seguridad contra incendios con respecto a su comunidad.
- Cada grupo discute sus respuestas a las preguntas.

- <u>Grupo 1: Riesgos</u>
- ¿Hay zonas en nuestra comunidad que corren un mayor riesgo de incendios?
- ¿Cuáles son algunas cosas que podemos hacer para reducir dichos riesgos?
- ¿Conoce Ud. de un incendio que hubo recientemente en su comunidad, que tuvo que ser apagado por los vecinos o los bomberos? ¿Se sabe cómo se originó el incendio?

- <u>Grupo 2: Prevención</u>
- ¿Qué podemos hacer para que no se repitan incendios?
- ¿Cuáles son algunos errores comunes que cometen las personas que pueden provocar incendios y cómo podemos evitarlos?

- ¿Cómo podemos educar a los niños y jóvenes de nuestra comunidad sobre seguridad y prevención de incendios?

- <u>Grupo 3: Concientización</u>
- ¿Qué recursos le gustaría que estuvieran disponibles en nuestra comunidad para ayudarnos a mejorar la seguridad y la prevención de incendios, como programas de capacitación o asistencia del gobierno local o departamental?
- ¿Cómo pueden ayudar nuestros líderes comunitarios a promover la seguridad y la prevención de incendios en nuestra comunidad?

2 **Conclusión- Gracias y Pensamientos Finales**

- Conclusiones del taller
- Comparta pensamientos finales con la comunidad
- Pregunta por cualquier duda
- Compartir información de contacto
- Foto de grupo
- Sesión de merienda

Appendix M: School and Vecino Workshop Presentation

Prevención de incendios en Cerrito

Por: El comité de seguridad contra incendios de la Escuela Cerrito

1

La Escuela Agrícola Cerrito

Caceres, N. (2016) *Cerrito Agricultural School Students* [Photograph] https://www.abc.com.py/tag/hotel-escuela-cerrito/

2

01

Incendios en Paraguay

La historia y las causas

Incendios en Paraguay

2019

El gobierno declaró emergencia ambiental por incendios forestales

2020

El Pantanal paraguayo experimentó un aumento del 376% en la cantidad de área quemada en comparación con los promedios de 2003-2019 (Garcia et al., 2021).

Incendios en Paraguay

2021

Se perdieron 277.000 hectáreas de bosque natural

2022

Un millón de hectáreas se han quemado

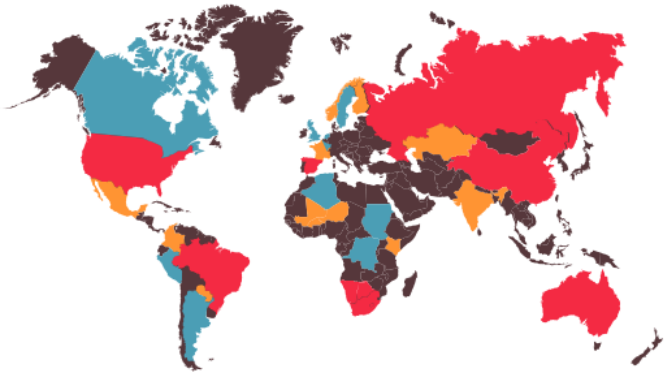
5

Comité de seguridad contra incendios de la Escuela Agrícola

Un Video Corto

6

Países con más incendios



- Mayor cantidad de incendios
- Gran cantidad de incendios
- Cantidad moderada de incendios.

7

Comité de seguridad contra incendios de la Escuela Agrícola

El Chaco tiene más riesgo de incendios porque ...

8

Origen de incendios más comunes en Benjamín Aceval

Quema de pastizales

Redacción Ad (2021) *Quema de pastizales* [Photograph] https://adnoticias.mx/quema-de-pastizales-una-tradicion-perjudicial-para-el-medio-ambiente/

Quema Basura

El Mineral (nd) *Quemando Basura* [Photograph] https://elmineral.com.mx/ver_anterior.php?artid=57406

Jugar con Fuego

https://damiaglobalservices.com/web-stories/top-5-common-fire-incidents/

No apagar completamente las fogatas

Actualidad provincial (2023) La Municipalidad recuerda la prohibición de hacer fuego en zonas agrestes https://recursoshumanostdf.ar/contenido/16961/la-municipalidad-recuerda-la-prohibicion-de-hacer-fuego-en-zonas-agrestes

Fallas en el sistema de electricidad

The Hans India (2020) *Low coble wires* [Photograph] https://www.thehansindia.com/news/cities/hyderabad/low-hanging-cables-put-people-in-a-state-of-tizzy-606268

9

Comité de seguridad contra incendios de la Escuela Agrícola

84%

Daley, J. (2017)

De todos los incendios forestales en el mundo son causados por seres humanos

10

02

Prevención y Seguridad contra Incendios

Los métodos y principios

Los Cuatro Principios de Seguridad contra Incendios

Prevención

Comunicación

Detección

Protección

Consejos de prevención y seguridad contra incendios

03

Riesgos y consecuencias de incendios forestales

Los impactos y las consecuencias

Los incendios pueden afectar …

a la gente

a las pertenencias

al entorno de mi comunidad

15

La Gente

P.Bronstein (2020) *Home destroyed by fire* [Photograph]
https://weaLas personas pueden perder su salud y sus vidas.ther.com/news/news/2020-09-10-historic-wildfires-impacts-california-oregon-washington

S.Finazzo (2018) *Carrying and Dragging Techniques* [Photograph]
https://www.offgridweb.com/preparation/carrying-dragging-techniques-lets-get-carried-away/

16

Las pertenencias

America Latina (nd) *Fire in Chile* [Photograph]
https://www.dw.com/es/incendios-en-chile-las-razones-de-la-tormenta-de-fuego-perfecta/a-64654936

17

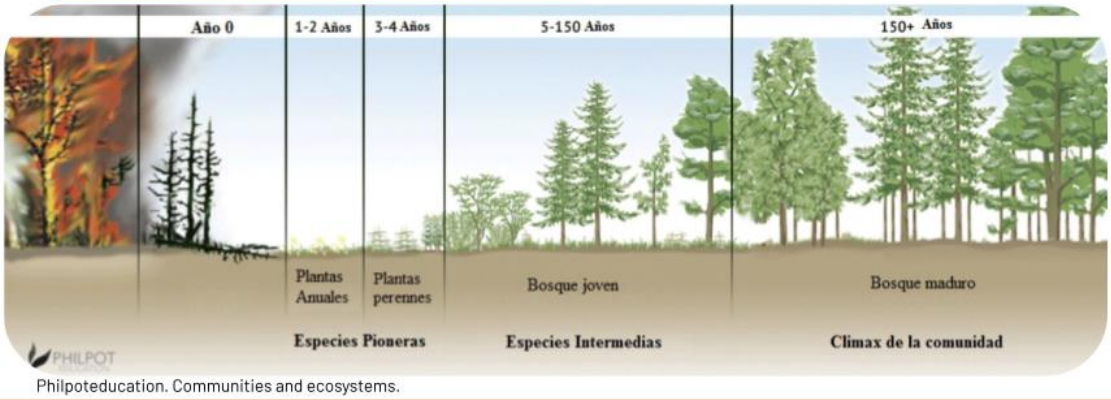
El entorno

Este año en enero se quemaron cerca de 50 eucaliptos que pertenecían a la comunidad

W.Sanchez (n.d.) *Burned Eucolyptus in Qom community* [Photograph]

18

El entorno



Philpoteducation. Communities and ecosystems.

19

El entorno

Alonso, M. (nd) *Fire in Chaco Region* [Photograph] https://www.aco.org.py/index.php/noticias-sp-2808l/destacadas/2961-productores-y-personal-de-estancias-fueron-instruidos-para-hacer-frente-a-los-incendios-en-el-chaco

Foto por Carlos Ezequiel , Agencia EFE

20

04

¿Cómo podemos mejorar la seguridad contra incendios?

Recomendaciones y conclusiones

Recomendaciones

No use fuego en áreas que son más propensas a incendiarse o cuando hay vientos fuertes

Reloj de evaluación de riesgo de incendio

23

Dinámica grupal

24

Las instrucciones

1. Formar grupos pequeños
2. En sus grupos, responder las preguntas asignadas.
3. Escribir en el la cartelera palabras o frases clave relacionadas con el tema de cada grupo.

25

Grupo 1: Riesgos

1. ¿Hay zonas en nuestra comunidad que corren un mayor riesgo de incendios?
2. ¿Cuáles son algunas cosas que podemos hacer para reducir dichos riesgos?
3. ¿Conoce Ud. de un incendio que hubo recientemente en su comunidad, que tuvo que ser apagado por los vecinos o los bomberos? ¿Se sabe cómo se originó el incendio?

Grupo 2: Prevención

1. ¿Qué podemos hacer para que no se repitan incendios?
2. ¿Cuáles son algunos errores comunes que cometen las personas que pueden provocar incendios y cómo podemos evitarlos?
3. ¿Cómo podemos educar a los niños y jóvenes de nuestra comunidad sobre seguridad y prevención de incendios?

Grupo 3: Concientización

1. ¿Qué recursos le gustaría que estuvieran disponibles en nuestra comunidad para ayudarnos a mejorar la seguridad y la prevención de incendios, como programas de capacitación o asistencia del gobierno local o departamental?
2. ¿Cómo pueden ayudar nuestros líderes comunitarios a promover la seguridad y la prevención de incendios en nuestra comunidad?

26

Las instrucciones para el Bingo

Vamos a decir palabras y si tiene la palabra, táchela con un marcador, una vez que obtenga 5 en una fila (a lo ancho, abajo o en diagonal) diga BINGO

Conclusiones del taller

- Los incendios son un problema creciente en Paraguay
- La seguridad contra incendios es necesaria para proteger a las personas, la propiedad y el medio ambiente en su comunidad
- Sea consciente de las causas de los incendios en su área
- El 84% de los incendios son provocados por personas, lo que significa que tenemos el poder de generar cambios

27

Gracias

¿Tiene usted alguna pregunta?

En caso de incendio llamar al 132

Fuentes

Garcia, L. C., Szabo, J. K., de Oliveira Roque, F., de Matos Martins Pereira, A., Nunes da Cunha, C., Damasceno-Júnior, G. A., Morato, R. G., Tomas, W. M., Libonati, R., & Ribeiro, D. B. (2021). Record-breaking wildfires in the world's largest continuous tropical wetland: Integrative fire management is urgently needed for both biodiversity and humans. Journal of Environmental Management, 293, 112870. https://doi.org/10.1016/j.jenvman.2021.112870

Daley, J. (2017). Study Shows 84% of Wildfires Caused by Humans. Smithsonian Magazine. https://www.smithsonianmag.com/smart-news/study-shows-84-wildfires-caused-humans-180962315/

"Incendios forestales en Paraguay." Youtube, Sole Silvero, 12 Marzo 2022, https://youtu.be/nFul4vn-_Ks

"¿Cómo prevenir los incendios forestales?." Youtube, Sinae, 15 Octubre 2020, https://www.youtube.com/watch?v=BM6FtJv9B5I

Appendix N: Qom Community Workshop Outline

Taller la comunidad de Qom de Seguridad contra Incendios

Fecha: 20/4/23
Meta del taller: Enfatizar la importancia de la seguridad contra incendios en nuestra comunidad objetivo.

Hora: **Articulo**: **Tema**:

10

Bienvenida y presentaciones- Inicio del taller

- Walter dará la bienvenida a todos y comenzará el taller.
- Palabras de Prof. Amalio
- Explicaremos nuestro objetivo del taller y porqué es importante.
- Presentarnos a nosotros mismos y al comité.

10

Presentación de Powerpoint: la importancia de la seguridad contra incendios

- Tabla de contenido de la presentación
- ¿Cuáles son los principios de seguridad contra incendios?
- ¿Cuáles son las causas y los riesgos de los incendios?
- Video corto sobre seguridad contra incendios.
- ¿Por qué es importante la seguridad contra incendios?

20

Actividad- Conversaciones

- Walter abre una discusión grupal con la comunidad sobre los incendios en su comunidad y sus ideas/opiniones.

2

Conclusión- Gracias y Pensamientos Finales

- Conclusiones del taller
- Comparta pensamientos finales con la comunidad
- Pregunta por cualquier duda
- Compartir información de contacto
- Foto de grupo
- Sesión de merienda

Appendix O: Qom Community Workshop Presentation

Prevención de incendios en Cerrito, Benjamin Aceval

Por: El Comité de Seguridad contra Incendios de la Escuela Cerrito

La Escuela Agrícola Cerrito

Caceres, N. (2016) Cerrito Agricultural School Students [Photograph] https://www.abc.com.py/tag/hotel-escuela-cerrito/

Incendios en Paraguay

2019 Declaró emergencia ambiental

2020 Experimentó un aumento del 376%

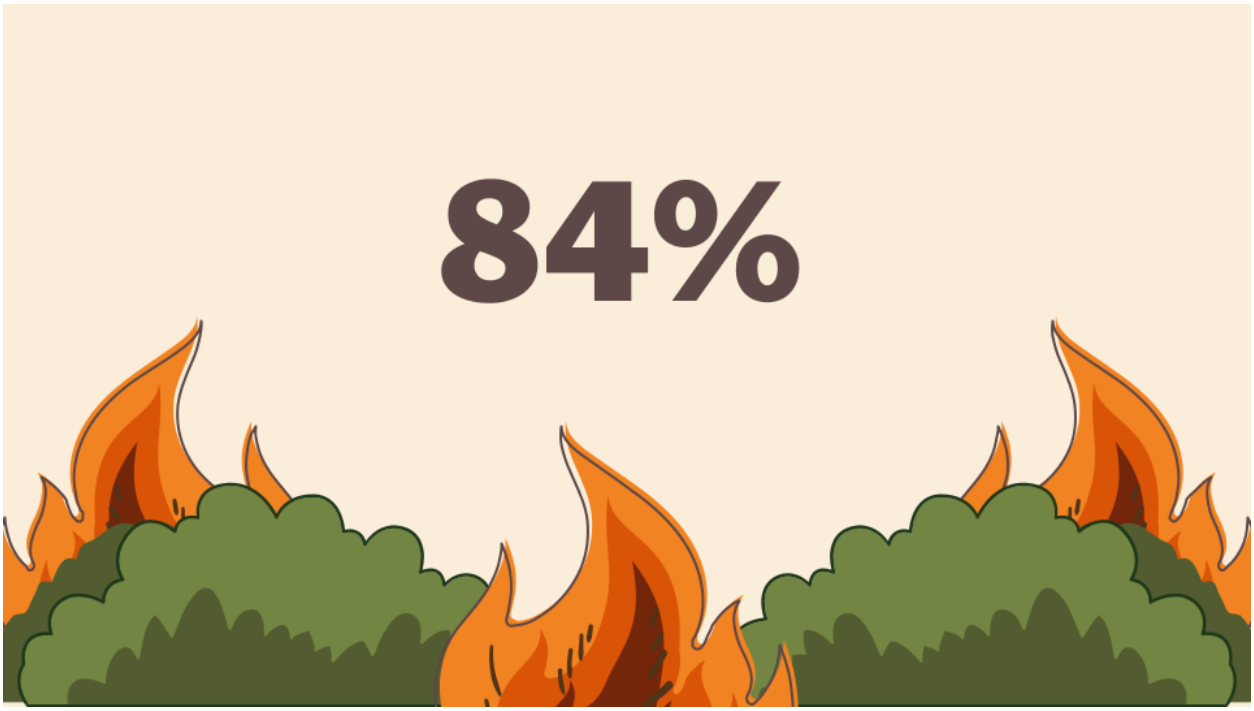
Se perdieron 277.000 hectáreas de bosque natural **2021**

Un millón de hectáreas se han quemado **2022**

Incendios en Paraguay

El Chaco tiene más riesgo de incendios porque ...

Origen de incendios más comunes en Benjamín Aceval


84%


Cuatro maneras de enfrentar los incendios
Prevención
Detección
Comunicación
Protección

Consejos de prevención y seguridad contra incendios

Los incendios pueden afectar ...

a la gente

a las pertenencias

al entorno

La gente

P.Bronstein (2020) *Home destroyed by fire* [Photograph]
https://weaLas personas pueden perder su salud y sus vidas.ther.com/news/news/2020-09-10-historic-wildfires-impacts-california-oregon-washington

S.Finazzo (2018) *Carrying and Dragging Techniques* [Photograph]
https://www.offgridweb.com/preparation/carrying-dragging-techniques-lets-get-carried-away/

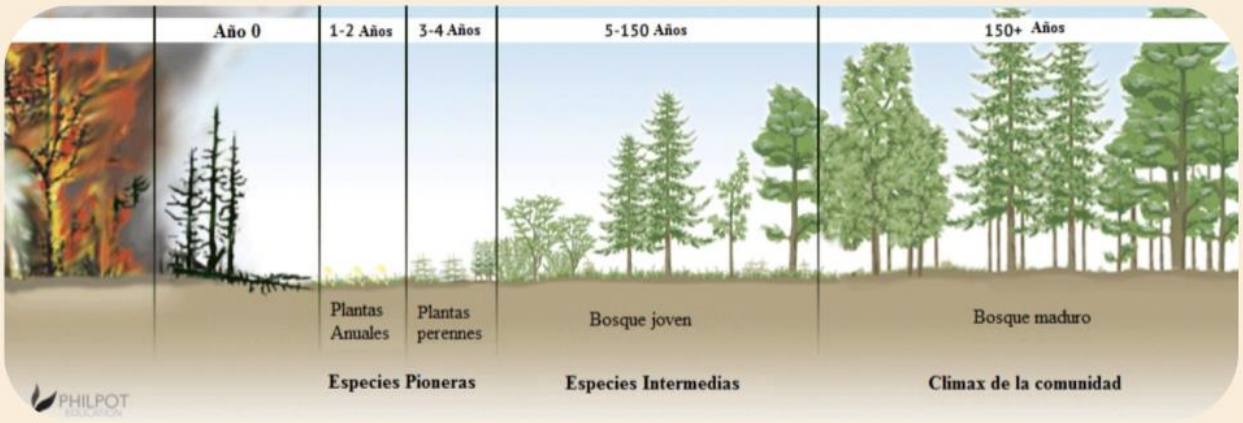
Las pertenencias

America Latina (nd) *Fire in Chile* [Photograph]
https://www.dw.com/es/incendios-en-chile-las-razones-de-la-tormenta-de-fuego-perfecta/a-64654936

El entorno

W. Sanchez (n.d.) Burned *Eucalyptus in Oom community* [Photograph]

El entorno



Philpoteducation. Communities and ecosystems.

El entorno

Alonso, M. (nd) *Fire in Chaco Region* [Photograph]
https://www.arp.org.py/index.php/noticias-sp-28081/destacadas/2861-productores-y-personal-de-estancias-fueron-instruidos-para-hacer-frente-a-los-incendios-en-el-chaco

N.Berger, (2013) *A cow walks by fire flames.* [Photograph]
https://www.nationalgeographic.com/environment/article/150914-animals-wildlife-wildfires-nation-california-science

¿Cómo podemos mejorar la seguridad contra incendios?

Reloj de evaluación de riesgo de incendio

Ejemplo de sitio web

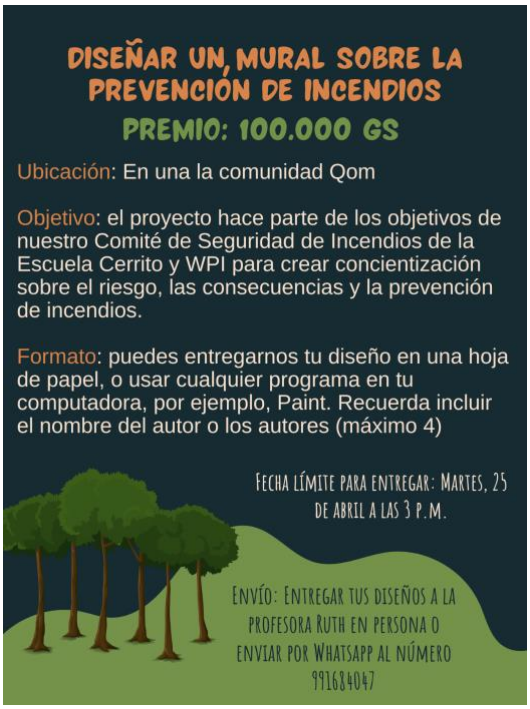
Conclusiones del taller

Gracias

En caso de incendio llamar al 132

Appendix P: Workshop Flyer for Comisión Vecinal

Appendix Q: Mural Contest Flyer



Appendix R: Committee Certificate Design

Appendix S: Committee Curriculum

English:

Future Curriculum (2023-2024)

May

- Determine which professor will oversee the committee
- Decide what days you will meet as a committee
- Organize a school fire drill
    - Use the local fire fighters
- Fire Danger Rating sign
    - Maintain and keep the sign up to date

June

- Fire Prevention Mural with the Qom Community
    - Committee will make a design for a large mural
    - The committee will organize the painting of the mural with Professor Ruth and Walter
- Fire Danger Rating sign

    - Maintain and keep the sign up to date

July

- Maps of the school
    - Labeling all fire breaks, evacuation routes, fire safety equipment, and emergency exits
- Fire Danger Rating sign
    - Maintain and keep the sign up to date

August

- Organize a cleanup campaign
    - Use resources from the school and the local fire department to clean up trash around Benjamín Aceval
- Fire Danger Rating sign
    - Maintain and keep the sign up to date

September

- Revisit the Qom and the Neighbors
- Fire Danger Rating sign
    - Maintain and keep the sign up to date

October

- Fire Prevention Documentation
    - Important phone numbers
    - Information on what to do incase of a fire
    - The maps of the school
- Fire Danger Rating sign
    - Maintain and keep the sign up to date

November

- Recruit new members for the fire committee
- Fire Danger Rating sign
    - Maintain and keep the sign up to date

December-January

- Summer break!

February

- Revisit the schools in Benjamín Aceval to do workshops
- Fire Danger Rating sign
    - Maintain and keep the sign up to date

March

- Work with new WPI students if they continue a project based on fire safety

- Fire Danger Rating sign
    - Maintain and keep the sign up to date

April

- Elections for the committee (President, Treasurer, and Secretary)
- Fire Danger Rating sign
    - Maintain and keep the sign up to date

Spanish:

Plan de estudios futuro (2023-2024)

Mayo

- Organizar un simulacro de incendio en la escuela
    - Utilice los bomberos locales
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Junio

- Mural de Prevención de Incendios con la Comunidad Qom
    - El comité hará un diseño para un gran mural.
    - El comité organizará la pintura del mural con la profesora Ruth y Walter
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Julio

- mapas de la escuela
    - Etiquetado de todos los cortafuegos, rutas de evacuación, equipos de seguridad contra incendios y salidas de emergencia
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Agosto

- Organiza una limpieza campaña
    - Usar Recursos de la escuela y el cuerpo de bomberos local para limpiar la basura alrededor de Benjamín Aceval
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Septiembre

- Volver a visitar los Qom y los vecinos
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Octubre

- Documentación de Prevención de Incendios
    - Números de teléfono importantes
    - Información sobre qué hacer en caso de incendio
    - Los mapas de la escuela.
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Noviembre

- Reclutar nuevos miembros para el comité de bomberos.
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Diciembre- Enero

¡Vacaciones de verano!

Febrero

- Revisitar las escuelas en Benjamín Aceval para hacer talleres
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

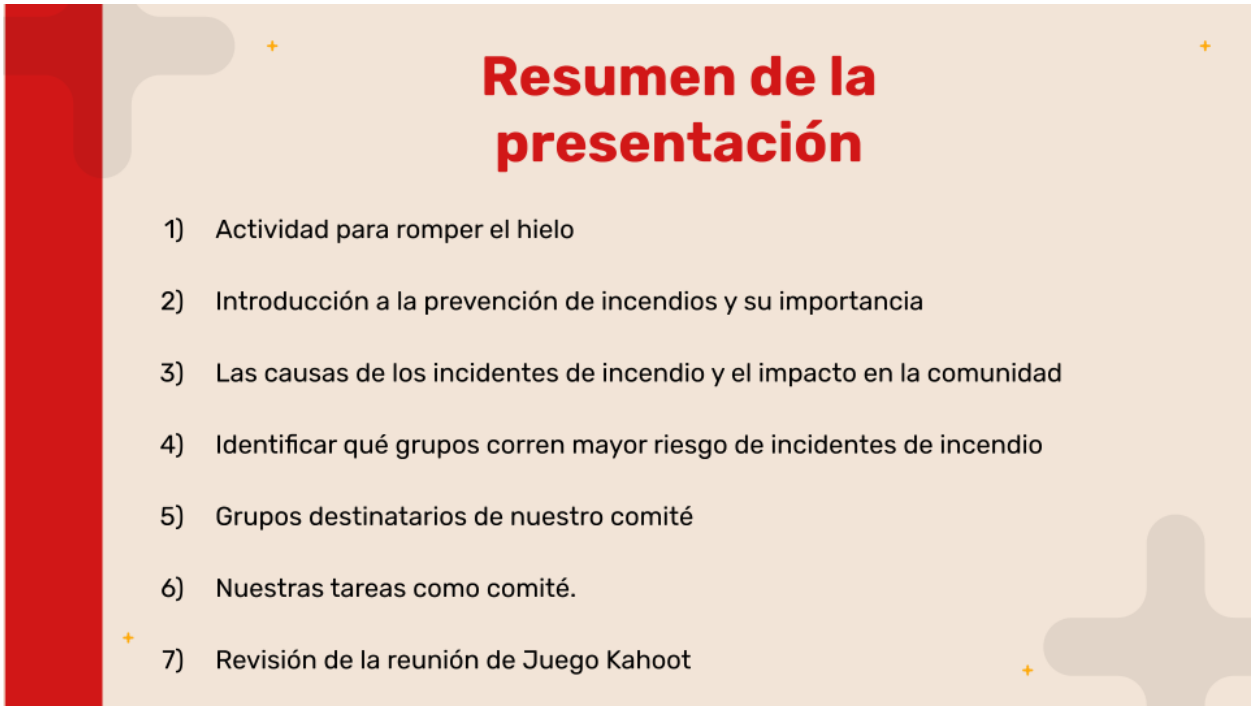
Marzo

- Trabajar con nuevos estudiantes de WPI si continúan un proyecto basado en la seguridad contra incendios.
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Abril

- Elecciones para el comité (Presidente, Tesorero y Secretario)
- Señal de clasificación de peligro de incendio
    - Mantener y mantener el registro actualizado

Appendix T: Committee Training Presentation



Actividad para romper el hielo: Mostrar y Contar

Prevención de incendios y su importancia

- En los últimos años ha habido un aumento de incendios en Paraguay
- Por ejemplo, en 2020 hubo un aumento del 376% en el área quemada de los humedales del Pantanal debido al aumento de los incendios forestales
- Aproximadamente el 99,7% de todos los incendios son causados por seres humanos
- Los riesgos fuera de control que presentan los incendios son daños a la propiedad, pérdida de vidas, disminución de la calidad del aire y pérdida de biodiversidad
- Esta es la razón por la cual la conciencia sobre cómo iniciar incendios y estar seguro alrededor de los incendios es crucial

Las causas de los incendios

Naturales	Humanos
altas temperaturas	quemando basura
vientos fuertes	limpieza de campos con fuegos
baja humedad	cocinar usando llamas abiertas
precipitaciones escasas	usar fuego cerca de materiales inflamables

Grupos destinatarios de nuestro comité

- Comunidad paraguayos latinos
- Comunidad de Qom
- Colegios y Escuelas en Benjamín Aceval

Grupos de mayor riesgo

- Niños pequeños
- Personas de edad avanzada
- Gente pobre

Nuestras tareas como comité

Los Vecinos

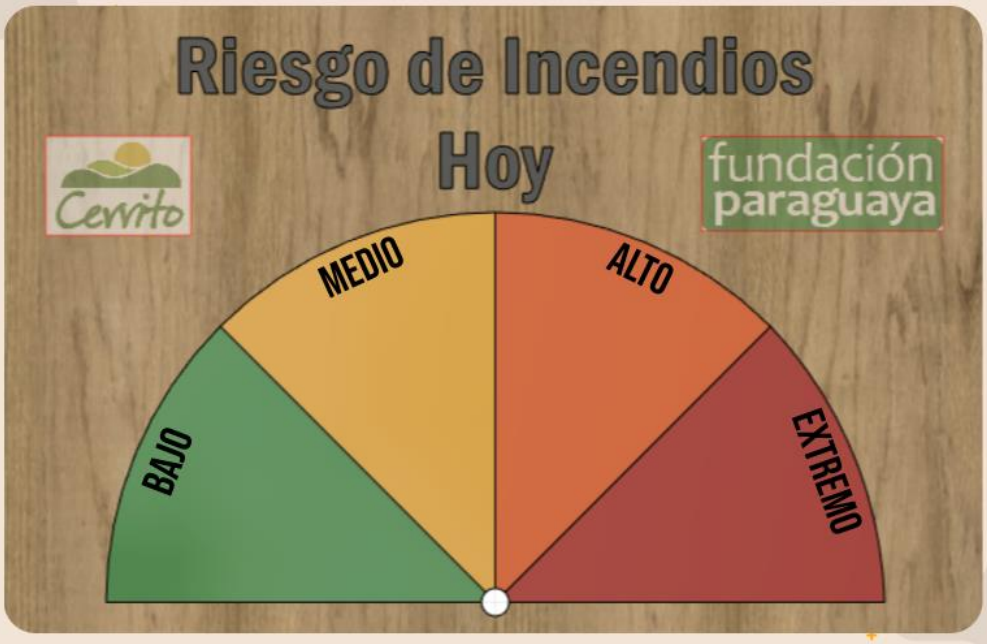
Tendremos un taller donde presentará a los paraguayos latinos la importancia de la seguridad contra incendios

Los Colegios y escuelas

Tendremos un taller para cuatro escuelas primarias y secundarias donde se presentará sobre la importancia de la seguridad contra incendios.

La Comunidad de Qom

Presentaremos a la comunidad de Qom videos, imágenes y una presentación sobre la importancia de la seguridad contra incendios.



Juego Kahoot!

https://create.kahoot.it/share/los-fuegitos-presentacion-2/dd29fd93-bc1b-4f2b-b740-bad8f5226d9f

Appendix U: Committee Kahoot Game Questions

¿Han aumentado los incendios en Paraguay?

¿Cuáles de estos son ejemplos de incendios de casos humanos?

¿Cuál de estos no es un grupo con el que trabajaremos?

¿Cuál de estos grupos corre más riesgo de resultar herido en un incendio?

¿Qué necesitarás hacer con los latinos paraguayos?

¿Cuáles de estos son factores que aumentan el riesgo de incendio?

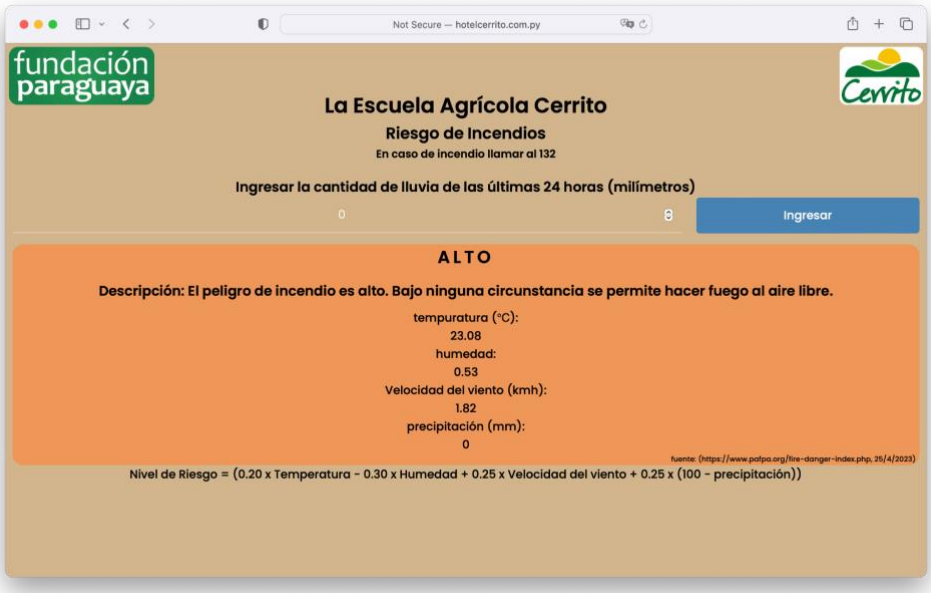
¿Cómo pueden las personas usar el fuego de manera segura?

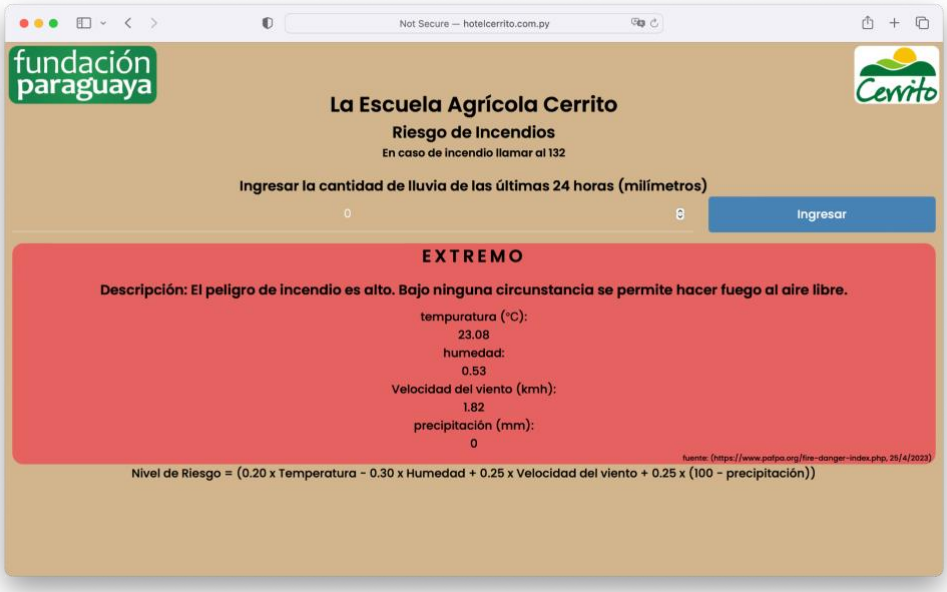
En el reloj de seguridad contra incendios, ¿qué representa el color rojo?

¿Estás emocionado de ser miembro de los fueguitos?

Appendix V: Website Risk Level Examples


Not Secure — hotelcerrito.com.py
fundación paraguaya
Cerrito
La Escuela Agrícola Cerrito
Riesgo de Incendios
En caso de incendio llamar al 132
Ingresar la cantidad de lluvia de las últimas 24 horas (milímetros)
0
Ingresar
MEDIO
Descripción: El peligro de incendio es moderado. Debe evitarse incendios al aire libre. Solo puede prenderse fuego en o parrillas con chimeneas designadas. Cualquier incendio debe ser monitoreado para evitar que se propague.
tempuratura (°C):
23.08
humedad:
0.53
Velocidad del viento (kmh):
1.82
precipitación (mm):
16
fuente: (https://www.patpa.org/fire-danger-index.php, 25/4/2023)
Nivel de Riesgo = (0.20 x Temperatura - 0.30 x Humedad + 0.25 x Velocidad del viento + 0.25 x (100 - precipitación))


Not Secure — hotelcerrito.com.py
fundación paraguaya
Cerrito
La Escuela Agrícola Cerrito
Riesgo de Incendios
En caso de incendio llamar al 132
Ingresar la cantidad de lluvia de las últimas 24 horas (milímetros)
0
Ingresar
ALTO
Descripción: El peligro de incendio es alto. Bajo ninguna circunstancia se permite hacer fuego al aire libre.
tempuratura (°C):
23.08
humedad:
0.53
Velocidad del viento (kmh):
1.82
precipitación (mm):
0
fuente: (https://www.patpa.org/fire-danger-index.php, 25/4/2023)
Nivel de Riesgo = (0.20 x Temperatura - 0.30 x Humedad + 0.25 x Velocidad del viento + 0.25 x (100 - precipitación))


Not Secure — hotelcerrito.com.py
fundación paraguaya
Cerrito
La Escuela Agrícola Cerrito
Riesgo de Incendios
En caso de incendio llamar al 132
Ingresar la cantidad de lluvia de las últimas 24 horas (milímetros)
0
0
Ingresar
EXTREMO
Descripción: El peligro de incendio es alto. Bajo ninguna circunstancia se permite hacer fuego al aire libre.
tempuratura (°C):
23.08
humedad:
0.53
Velocidad del viento (kmh):
1.82
precipitación (mm):
0
fuente: (https://www.pafpa.org/fire-danger-index.php, 25/4/2023)
Nivel de Riesgo = (0.20 x Temperatura - 0.30 x Humedad + 0.25 x Velocidad del viento + 0.25 x (100 - precipitación))